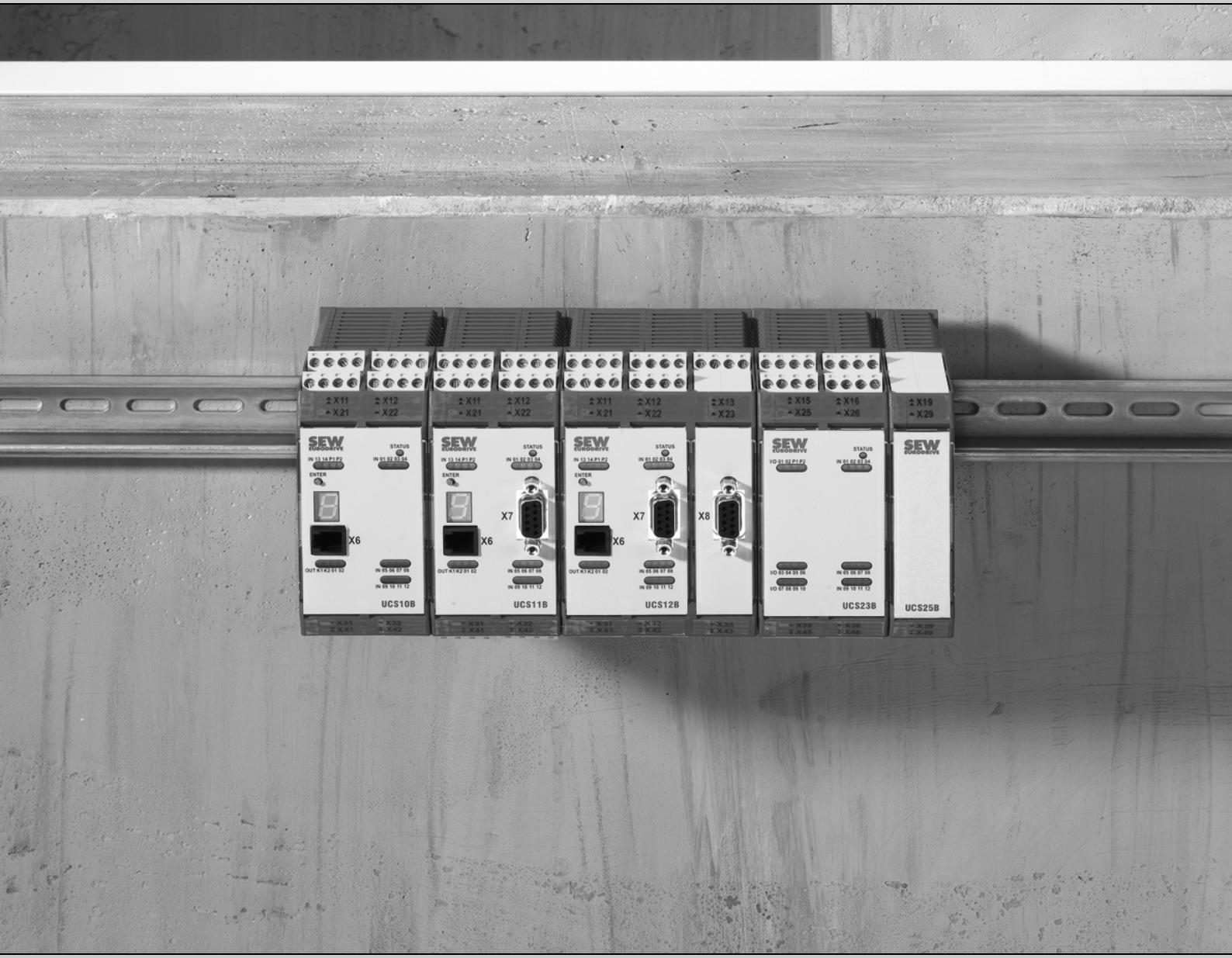
SEW EURODRIVE

Operating Instructions



Safety Modules MOVISAFE® UCS..B Compact

Edition 08/2012

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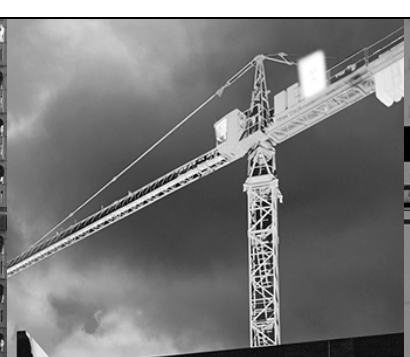


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1 General Information

1.1 How to use this documentation

The documentation is an integral part of the product and contains important information on operation and service. Programming and parameterization is described in the online help of the MOVISAFE® Config UCS compact software. The documentation is written for all employees who assemble, install, start up, and service this product.

The documentation must be accessible and legible. Make sure that persons responsible for the system and its operation as well as persons who work independently with the software and the connected units, have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent danger	Severe or fatal injuries
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	

1.2.2 Structure of the section safety notes

Section safety notes do not apply to a specific action but to several actions pertaining to one subject. The symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a section safety note:

⚠ SIGNAL WORD

Type and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Structure of the embedded safety notes

Embedded safety notes are directly integrated in the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

- ⚠**SIGNAL WORD** Type and source of danger.

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the danger.

1.3 Rights to claim under warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the present documentation. Read the documentation first before you start to work with the software and the connected devices.

Make sure that the documentation is available to persons responsible for the system and its operation as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

1.4 Exclusion of liability

You must observe this documentation and the documentation of the connected devices from SEW-EURODRIVE to ensure safe operation and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-adherence to this documentation. In such cases, any liability for defects is excluded.

1.5 Copyright

1.6 Product names and trademarks

The product names mentioned in this documentation are trademarks or registered trademarks of the titleholders.

1.7 Other applicable documentation

Observe the following applicable documents:

- Online help of the MOVISAFE® Config UCS compact software
- MOVISAFE® UCS..B system manual
- Validation report of the MOVISAFE® Config UCS compact software is used as acceptance protocol during validation.
- Certificates and characteristic safety values for the MOVISAFE® UCS..B safety modules.

Make sure you always use the latest documentation and software version.

Our documentation is available in various languages for download from the SEW homepage (www.sew-eurodrive.com). If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE directly.

If required, you can order printed copies of the documentation from SEW-EURODRIVE GmbH & Co KG.

1.8 Definitions

- The designation UCS..B is used as a generic term for all derivatives of the MOVISAFE® UCS.B product series. If the operating instructions refer to a certain derivative, the full designation is used.
- The term "safe" used in this document refers to the classification as safe function for use up to category 4 / performance level e (PI e) according to EN ISO 13849-1 and SIL3 according to EN 61508.
- The parameter setting software "MOVISAFE® Config UCS compact" is a programming and configuration tool for the MOVISAFE® UCS..B compact unit series.
- Internally, the components of the MOVISAFE® unit series consist of 2 independent processing units. They are referred to as system A and system B in this document.

1.9 Abbreviations used

Abbreviation	Meaning
IL	Instruction list
BG	German association for statutory accident insurance and prevention
BST	Safety-related brake module
DIP	Dual In-Line Package
IFA	Institute for Occupational Safety and Health of the German Social Accident Insurance (formerly known as BGIA)
CLK	Clock
CRC	Cyclic Redundancy Check
DC	• For safety functions: Diagnostic coverage • Voltage ratings: DC voltage
DI	Digital input (binary input)
DIN	German institute for standardization
DIO	Digital Input/Output (binary input/output)
DIP	Dual In-Line Package
DO	Digital output (binary output)
ECS	Encoder Supervisor
ELC	Emergency Limit Control
EMU	Emergency Monitoring Unit
EMC	Electromagnetic compatibility
EOS	External Offset Setup
EN	European standard
F PLC	Failsafe programmable logic controller
Hiside	Output switching to positive with DC 24 V
HTL	High transistor logic (on DC 24 V basis)
IP	Ingress Protection (degree of protection)
ISO	International Organization for Standardization
Cat.	Category
LED	Light Emitting Diode
Loside	Output switching to the reference potential
OSSD	Output signal switching device
PAA	Process image of the outputs
PAE	Process image of the inputs
P1, P2	Pulse output 1, 2
PELV	Protective extra low voltage
PES	Programmable electronic system
PDM	Position deviation mode
PL	Performance Level

Abbreviation	Meaning
PNO	PROFIBUS user organization e. V.
PRF	Position Reference Function
POR	Power On Reset
PLC	Programmable logic controller
PSC	Position speed control
SAR	Safe Acceleration Range
SBC	Safe Brake Control
SCA	Safe Cam
SIL	Safety Integrity Level
SLA	Safely Limited Acceleration
SLP	Safely Limited Position
SDI	Safe Direction
SEL	Safe emergency limit
SELV	Safety extra low voltage
SLI	Safely Limited Increment
SLS	Safely Limited Speed
SOS	Safe Operating Stop
SRP/CS	Safety-related parts of a control system
SSR	Safe Speed Range
SSX	Safe stop, can be parameterized as SS1 or SS2
SPS	Programmable controller
STO	Safe Torque Off
HP	Horizontal Pitch
TTL	Transistor-transistor logic
VDE	German Association for Electrical, Electronic & Information Technologies

2 Safety Notes

2.1 General information

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and adhered to.

Ensure that persons responsible for the machinery and its operation as well as persons who work independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, please contact SEW-EURODRIVE.

Also adhere to the supplementary safety notes in this document and in the documentation of the connected devices from SEW-EURODRIVE.

This document does not replace the detailed documentation of the connected devices. This documentation assumes that the user has access to and is familiar with the documentation for all connected units from SEW-EURODRIVE.

Never install damaged products or take them into operation. Submit a complaint to the shipping company immediately in the event of damage.

This documentation focuses on the basic functions of the unit and the corresponding installation. The programming is illustrated in the online help. The corresponding knowledge is a key requirement for working with MOVISAFE® UCS..B.

Removing covers without authorization, improper use or incorrect installation and operation may result in severe injuries to persons or damage to machinery. Refer to the documentation for additional information.

2.2 Target group

Any work with the software may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who have the following qualifications:

- Appropriate instruction.
- Knowledge of this documentation and other applicable documentation.
- SEW-EURODRIVE recommends additional product training for products that are operated using this software.

Any mechanical work on connected units may only be performed by adequately qualified personnel. Qualified personnell in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting and servicing of the product who possess the following qualifications:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- Knowledge of this documentation and other applicable documentation.

Any electrical work on connected units may only be performed by adequately qualified electricians. Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- Knowledge of this documentation and other applicable documentation.
- Knowledge of the relevant safety regulations and laws.
- Knowledge of the other standards, guidelines, and laws mentioned in this documentation.

The above mentioned persons must have the authorization expressly issued by the company to install, operate, program, configure, label and ground units, systems and circuits in accordance with the standards of safety technology.

All work in further areas of transportation, storage, operation and waste disposal must only be carried out by persons who are trained appropriately.

2.3 Designated use

The MOVISAFE® UCS..B safety modules are modular, programmable safety controllers for the implementation of safe disconnection functions and safety functions. The units are intended for use

- in emergency switching off devices
- as safety component according to Directive 2006/42/EC (Machinery Directive)
- as PES for risk reduction according to EN 61508
- in safety circuits according to EN 60204-1
- as PES for functional safety according to EN 62061
- as SRP/CS according to EN ISO 13849
- as device for implementing the safety functions according to EN 61800-5-2
- as logics unit for signal conversion and processing in two-hand control according to EN 574

The safety modules, including the expansion assembly, are safety components according to appendix IV Directive 2006/42/EC (Machinery Directive). They have been developed, designed and produced in compliance with the directive mentioned above, as well as the EMC Directive 2004/108/EC.

You must observe the technical data and information on the connection requirements as provided on the nameplate and in the documentation.

INFORMATION

- Ensure compliance with nationally applicable laws and directives before you start the designated operation.
- MOVISAFE® UCS..B safety modules can be used in UL-relevant countries. Therefore, the maximum voltage of the relay contacts must be limited to DC 24 V.

2.4 Transportation and storage

You must observe the information regarding transport, storage and proper handling according to EN 60068-2-6 in reference to the values specified in chapter "Technical Data". Comply with the requirements for climatic conditions stated in chapter "Technical Data".

2.5 Installation

The safety modules must be installed and cooled according to the regulations and specifications in the relevant documentation.

Protect MOVISAFE® UCS..B safety modules from improper strain. Especially during transportation and handling, do not allow the components to be deformed or insulation spaces altered. Avoid contact with electronic components and contacts.

MOVISAFE® UCS..B safety modules contain components that can be damaged by electrostatic energy and could suffer irreparable damage in case of improper handling. During installation or removal of the safety module, avoid any electrostatic discharge to the terminal and plug-in connections routed to the outside. Prevent mechanical damage or destruction of electric components (may pose health risk).

The following applications are prohibited unless explicitly permitted:

- Use in potentially explosive atmospheres
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.

2.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live MOVISAFE® UCS..B safety modules (e.g. BGV A3).

Perform electrical installation according to the pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

You will find notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the documentation of the safety module. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

Preventive measures and protection devices must meet the regulations in force (e.g. EN 60204).

2.7 Operation

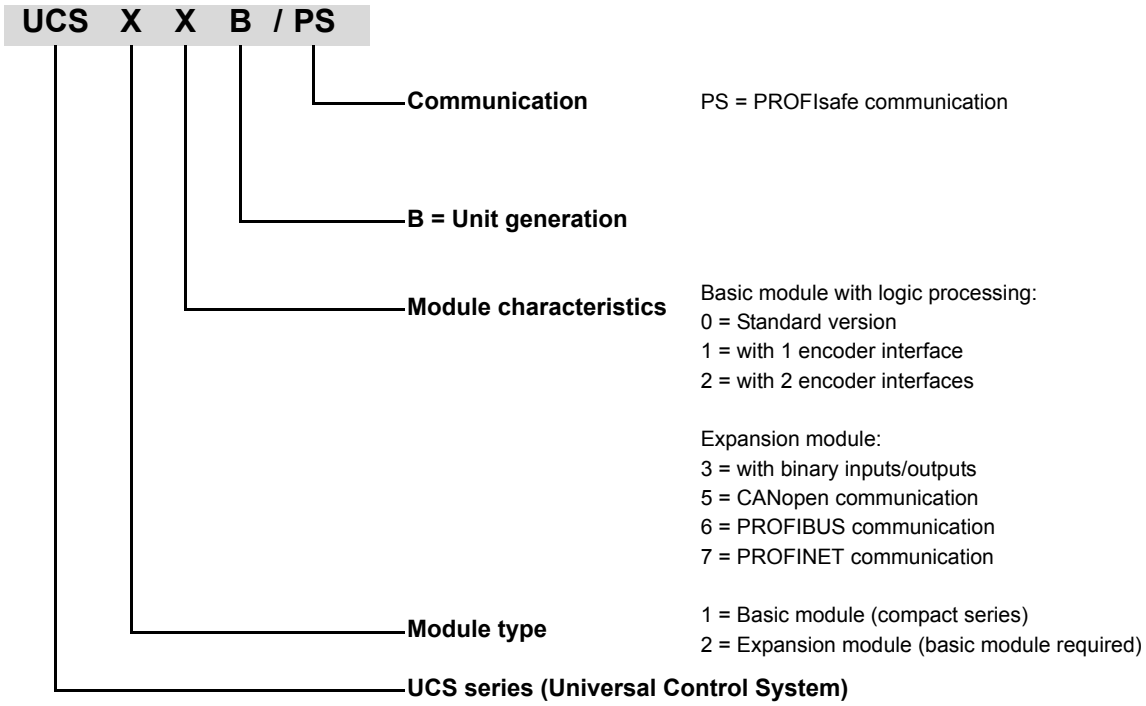
- Systems with integrated MOVISAFE® UCS..B safety modules must be equipped with additional monitoring and protection devices, if necessary, according to the applicable safety guidelines, such as the law governing technical equipment, accident prevention regulations, etc.
- The fact that the status LED and other display elements are no longer illuminated does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.
- Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive re-starting automatically. If this is not permitted for the driven machine for safety reasons, disconnect the unit from the supply system before correcting the error.
- The system/machine manufacturer must perform a system/machine-specific risk analysis. The use of the drive system must be considered for the analysis.
- The safety concept is only suitable for performing mechanical work on the system/machine components.

  Before carrying out work on the electrical section of the drive system, the supply voltage must be disconnected using an external maintenance switch/main switch.
- When the DC 24 V voltage supply is disconnected, mains voltage is still present on the drive inverter's DC link.
- The safety functions must be implemented in such a way that they suit the risk assessment and the hazards of the application. Factors to be taken into account are regenerative energies, such as lifting axis, inclined travel distances and slowing down distances. If these factors are part of the safety concept, they have to be implemented in a safety-relevant manner.
- When using the SS1(c)/SS2(c) function, the deceleration of the drive is not monitored with respect to safety. In the event of a fault, the drive might not be braked during the deceleration time, or it might even accelerate.

  In this case, the STO function is only activated after the set time delay has passed. The resulting danger must be taken into account for the risk analysis of the system/machine. Additional safety measures have to be implemented if required.

3 Unit Structure

3.1 Type designation



3.2 Scope of delivery

- MOVISAFE® UCS..B, UCS..B/PS safety module
- Connector for all signal terminals without encoder connection
- Backplane bus connector:
  - 2 pieces for UCS23B expansion module
  - 1 piece for UCS25B expansion module, UCS26B, UCS27B

INFORMATION

- The scope of delivery of the basic module does not include backplane bus connectors.
- In the event of an order for a basic module in connection with an expansion or diagnostics module
  - via the configurator:
    The required number of backplane bus connectors is enclosed with the delivery
  - via part number:
    You must order the backplane bus connectors as accessories (5 pieces per package, part number 1822 244 7).
- For further information, refer to chapter "backplane bus connectors".

3.2.1 Optional scope of delivery

Software

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The license dongle enables the entire functionality of the MOVISAFE® Config UCS compact software. The software can be used without license dongle but the functionality will be limited.

MOVISAFE® Config UCS compact functionalities	
with license dongle	**without license dongle**
• Creating a program • Compiling a program • Saving a program • Loading a program from the PC to the UCS..B/PS option	• Function chart diagnostics and scope • Unit replacement (data storage); up or download of a configuration file (".cfg") • Activating a safety data set (with UCS..B/PS option) • Creating a validation report

INFORMATION

- The license dongle is not included in the scope of delivery. You can order the license dongle via part number 1058 5834.
- The driver for the license dongle is installed during installation of the MOVISAFE® Config UCS compact software.
- The license dongle is compatible with the MOVISAFE® UCS..B and DCS..B product series.

3.3 Unit properties

3.3.1 General information

Property	MOVISAFE® UCS safety module									
	10B	10B/PS	11B	11B/PS	12B	12B/PS	23B	25B	26B	27B
Max number of expansion modules with binary inputs/outputs	2						-	-		
Safe binary inputs	14						12	-		
Safe configurable binary inputs/outputs	-						10	-		
Safe binary outputs	2						-	-		
Safe relay outputs	1						-	-		
Standard outputs	2							-		
Pulse outputs for crossfault monitoring	2							-		
Encoder interface for SIN/COS, TTL incremental or SSI signals	-	-	1	1	2	2	-	-		
Encoder interface for HTL signals	-	-	1				-	-		
Freely programmable logics	X						-	-		
Safety functions for speed and position monitoring	-	-	X	X	X	X	-	-		
Safe communication (CAN-S)	-	X	-	X	-	X	-	-		
SBus communication	-	X	-	X	-	X	-	-		
Communication (CAN)	-	-	-	-	-	-	-	X		
PROFIBUS communication	-	-	-	-	-	-	-	-	X	
PROFINET communication	-	-	-	-	-	-	-	-	-	X
Number of monitored axes	-	-	1	1	2	2	-	-		

INFORMATION

- CAN-S enables connection to the fieldbus system PROFIBUS with PROFIsafe or PROFINET with PROFIsafe. The following components can be used for this purpose:
  - Controllers DHR/DHF21B and DHR/DHF41B of the type MOVI-PLC® or CCU
  - DFS12B/22B fieldbus interface only in combination with MOVIDRIVE® B
- CAN allows for standard data transmission based on CANopen.
- PROFIBUS allows for standard data transmission based on PROFIBUS.
- PROFINET allows for standard data transmission based on PROFINET.

3.3.2 Safety functions

The safety functions available in the MOVISAFE® UCS..B modules are based on the definitions of the DIN EN 61800-5-2 standard. Some functions of the modules exceed the definitions specified in the standard.

The MOVISAFE® Config UCS compact software selects possible safety functions depending on the configuration, the basic module used, and the encoder or encoder combination. The safety functions can be freely configured and programmed in the logics.

The following table provides an overview of the maximum number of safety functions with respect to the individual safety module.

Safety function	UCS10B UCS10B/PS	UCS11B UCS11B/PS	UCS12B[1)] UCS12B/PS	UCS12B, UCS12B/PS[2)]		UCS23B
				Axis 1	Axis 2	
ECS	-	1	1	1[3)]		-
EMU	2	2	2	2[3)]		10
PDM	-	1	1	1	1	-
SAR	-	Implementation possible using SCA				-
SBC	Implementation through safe output					
SCA	-	16	16	16[3)]		-
SDI	-	1	1	1	1	-
SEL	-	1	1	1	1	-
SLA	-	Integrated in SEL, SLP, SCA, SSX, SLS, SOS				-

Safety function	UCS10B UCS10B/PS	UCS11B UCS11B/PS	UCS12B[1] UCS12B/PS	UCS12B, UCS12B/PS[2] Axis 1	 Axis 2	UCS23B
SLI	-	1	1	1	1	-
SLP	-	2	2	2[3]		-
SLS	-	8	8	8[3]		-
SOS	-	1	1	1	1	-
SS1(c)	Implementation through timer and safe output					
SS2(c)	-	Requires SOS				-
SSR	-	Implementation possible using SCA				-
SSX[4]	-	2	2	2	2	-
STO	Implementation through safe output					

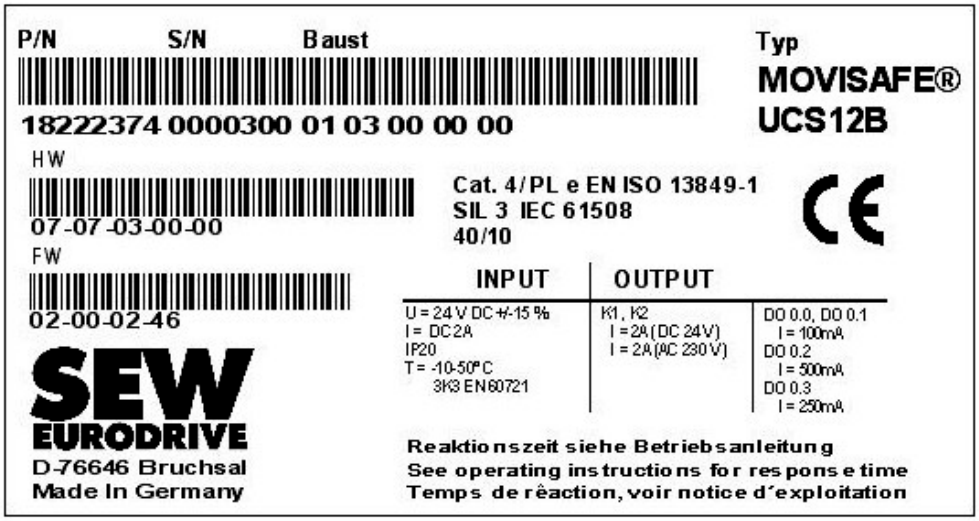
1) Axis monitoring
2) Separate monitoring of 2 axes
3) The number of safety functions can be divided among the axes as required
4) The SSX safety function can be configured as SS1(b) or SS2(b)

3.4 UCS..B nameplate

The nameplate is attached to the side of the unit and contains the following information:

- Part number (P/N)
- Serial number (S/N)
- Configuration status (Baust)
- Type designation
- Hardware status (HW)
- Firmware status (FW)
- Production date (here: 40/10, which means week 40 in 2010)
- Permitted standards
- Technical data (input, output)
- Information about response times

Example:



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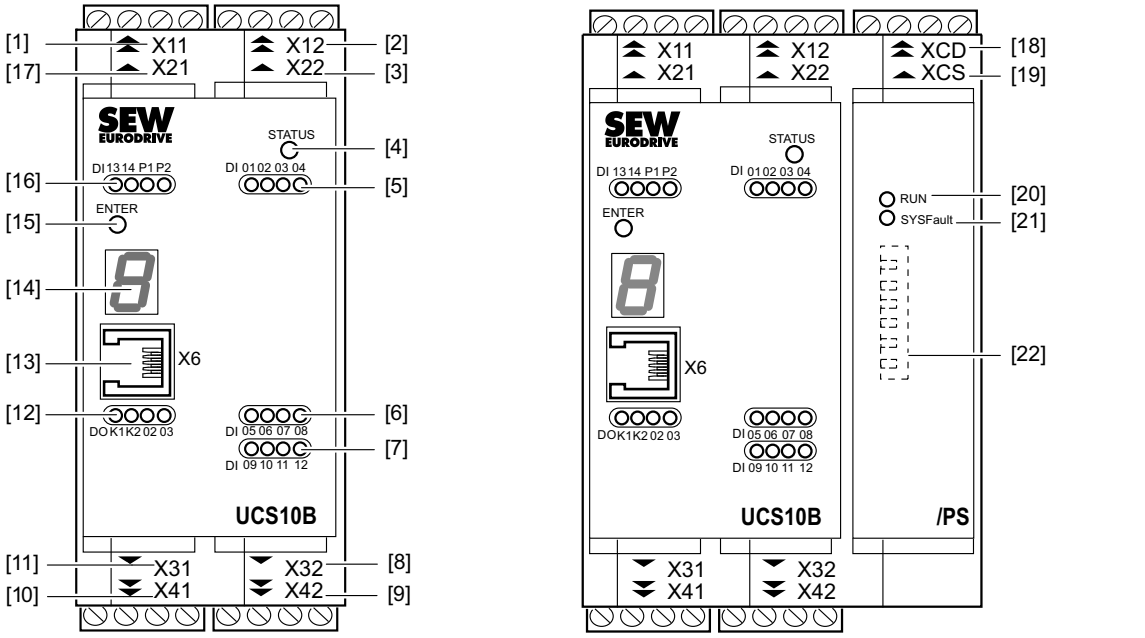
3.5 Unit structure of basic modules

3.5.1 UCS10B, UCS10B/PS



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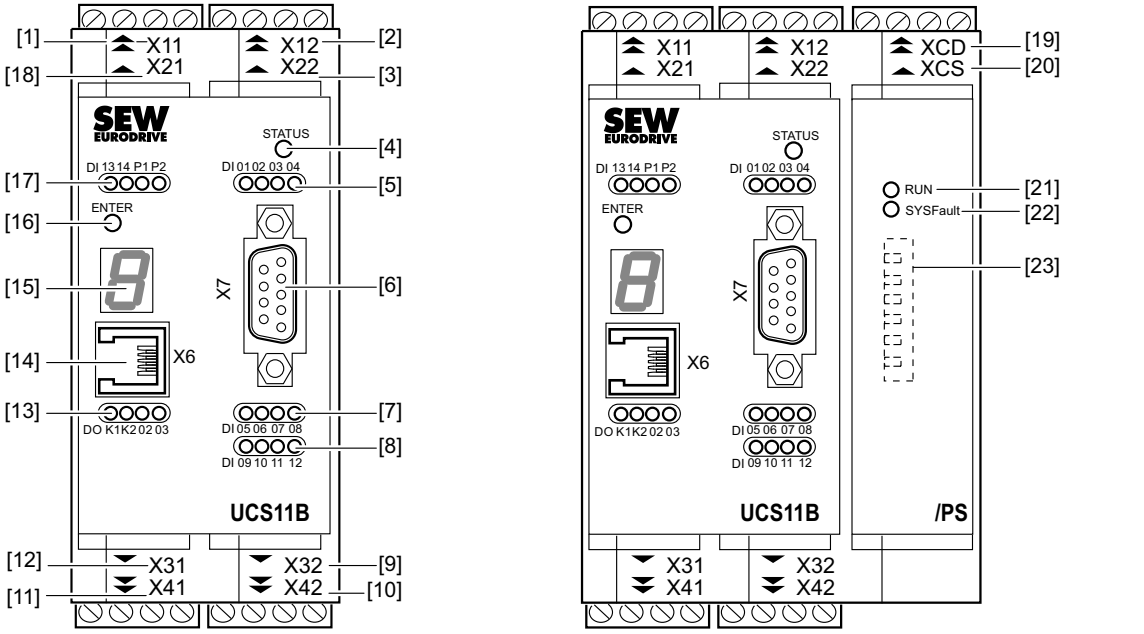
[1]	X11	DC 24 V voltage supply connection
[2]	X12	Auxiliary output connection
[3]	X22	Connection for safe binary inputs
[4]	STATUS	LED display of the system status
[5]	DI 01 – 04	LED display: Status of binary inputs
[6]	DI 05 – 08	LED display: Status of binary inputs
[7]	DI 09 – 12	LED display: Status of binary inputs
[8]	X32	Connection for safe binary inputs
[9]	X42	Connection for safe binary inputs
[10]	X41	Connection for relay outputs
[11]	X31	Hi/Loside output connection
[12]	K1, K2	LED display: Relay output status
	DO 02, 03	LED display: High/low side output status
[13]	X6	Terminal for service interface
[14]		7-segment display, display of the system status
[15]	ENTER	Button for reset and display of the CRC codes
[16]	DI 13, 14	LED display: Status of binary inputs
	P1, P2	LED display: Pulse output status
[17]	X21	Connection for safe binary inputs and pulse outputs

Additionally for UCS10B//PS option:

[18]	XCD	Connection for CAN diagnostics communication
[19]	XCS	Connection for CAN safe communication (PROFIsafe)
[20]	Run	LED display, status of communication interface operation
[21]	SYSFault	LED display, status of communication interface connection
[22]		DIP switches, CAN communication addressing

3.5.2 UCS11B, UCS11B/PS



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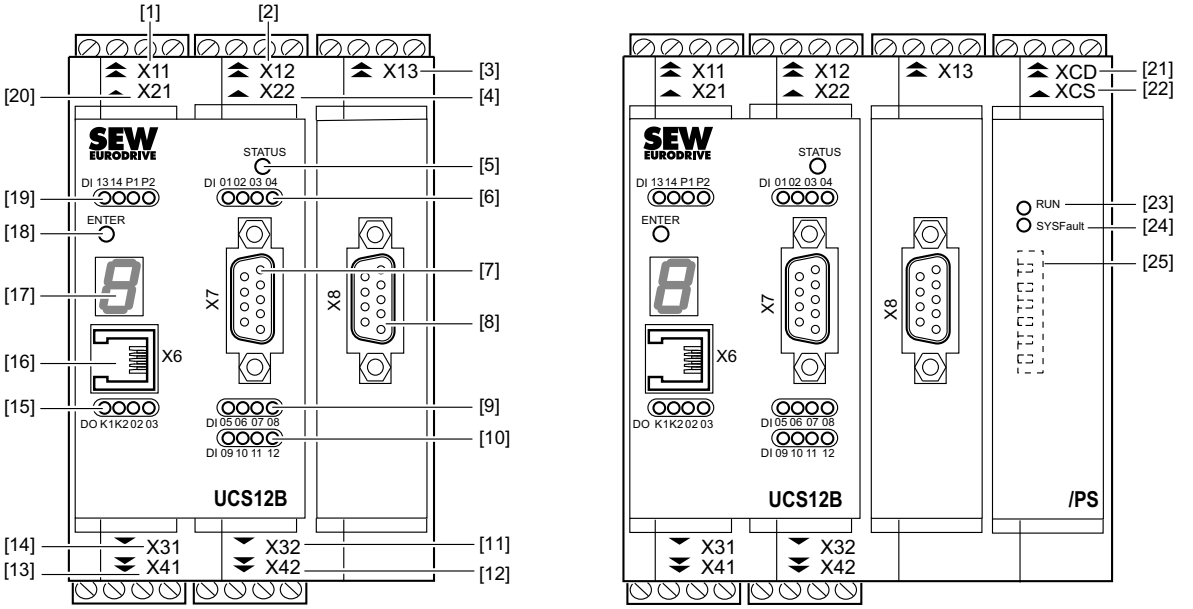
[1]	X11	Power supply connection
[2]	X12	Voltage supply connection for encoders at X7 Signal relay connection
[3]	X22	Input connection
[4]	STATUS	LED display: Indicates the system state
[5]	DI 01 – 04	LED display: Status of binary inputs
[6]	X7	Connection for TTL incremental, SIN/COS, SSI encoders
[7]	DI 05 – 08	LED display: Status of binary inputs
[8]	DI 09 – 12	LED display: Status of binary inputs
[9]	X32	Connection for safe binary inputs, HTL encoder connection
[10]	X42	Input connection
[11]	X41	Relay output connection
[12]	X31	Hi/Loside output connection
[13]	K1, K2	LED display: Status of relay outputs
	DO 02, 03	LED display: Status of high/low side outputs
[14]	X6	Terminal for service interface
[15]		7-segment display, indicates the system state
[16]	ENTER	Button for reset and display of the CRC codes
[17]	DI 13, 14	LED display: Status of binary inputs
	P1, P2	LED display: Status of pulse outputs
[18]	X21	Connection for safe binary inputs, pulse output connection

Additionally for UCS11B//PS option:

[19]	XCD	Connection for CAN diagnostics communication
[20]	XCS	Connection for CAN safe communication (PROFIsafe)
[21]	Run	LED display, status of communication interface operation
[22]	SYSFault	LED display, status of communication interface connection
[23]		DIP switches, CAN communication addressing

3.5.3 UCS12B, UCS12B/PS



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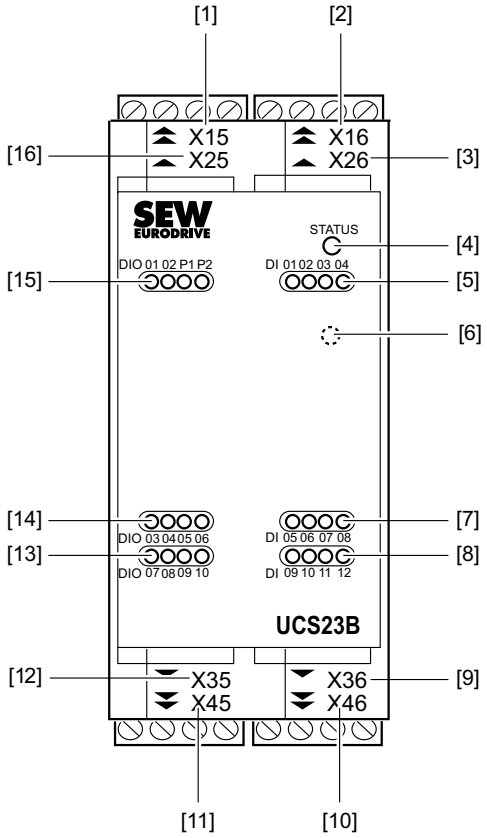
[1]	X11	Power supply connection
[2]	X12	Voltage supply connection for encoders at X7 Signal relay connection
[3]	X13	Voltage supply connection for encoders at X8
[4]	X22	Connection for inputs
[5]	STATUS	LED display: Indicates the system state
[6]	DI 01 – 04	LED display: Status of binary inputs
[7]	X7	Connection for TTL incremental, SIN/COS, SSI encoders
[8]	X8	Connection for TTL incremental, SIN/COS, SSI encoders
[9]	DI 05 – 08	LED display: Status of binary inputs
[10]	DI 09 – 12	LED display: Status of binary inputs
[11]	X32	Connection for safe binary inputs, HTL encoder connection
[12]	X42	Connection for inputs
[13]	X41	Relay output connection
[14]	X31	Hi/Loside output connection
[15]	K1, K2	LED display: Status of relay outputs
	DO 02, 03	LED display: Status of high/low side outputs
[16]	X6	Terminal for service interface
[17]		7-segment display, indicates the system state
[18]	ENTER	Button for reset and display of CRC codes
[19]	DI 13, 14	LED display: Status of binary inputs
	P1, P2	LED display: Status of pulse outputs
[20]	X21	Connection for safe binary inputs, pulse output connection

Additionally for UCS12B//PS option:

[21]	XCD	Connection for CAN diagnostics communication
[22]	XCS	Connection for CAN safe communication (PROFIsafe)
[23]	Run	LED display, status of communication interface operation
[24]	SYSFault	LED display, status of communication interface connection
[25]		DIP switches, CAN communication addressing

3.6 Unit structure of expansion module

3.6.1 UCS23B



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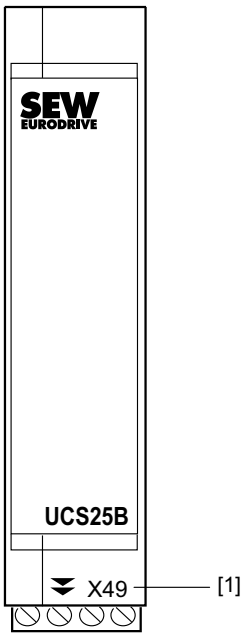
[1]	X15	Power supply connection
[2]	X16	Auxiliary output connection
[3]	X26	Binary input connection
[4]	STATUS	LED display of the system state
[5]	DI 01 – 04	LED display: Status of binary inputs
[6]		Address selection switch for addressing the module (on rear of module)
[7]	DI 05 – 08	LED display: Status of binary inputs
[8]	DI 09 – 12	LED display: Status of binary inputs
[9]	X36	Connection for binary inputs
[10]	X46	Connection for binary inputs
[11]	X45	Configurable binary input/output connection
[12]	X35	Configurable binary input/output connection
[13]	DIO 07 – 10	LED display: Status of configurable binary inputs/outputs
[14]	DIO 03 – 06	LED display: Status of configurable binary inputs/outputs
[15]	DIO 01, 02	LED display: Status of configurable binary inputs/outputs
	P1, P2	LED display: Status of pulse outputs
[16]	X25	Connection for configurable binary inputs/outputs
		Connection for pulse outputs

3.7 Unit structure of diagnostic modules

3.7.1 UCS25B



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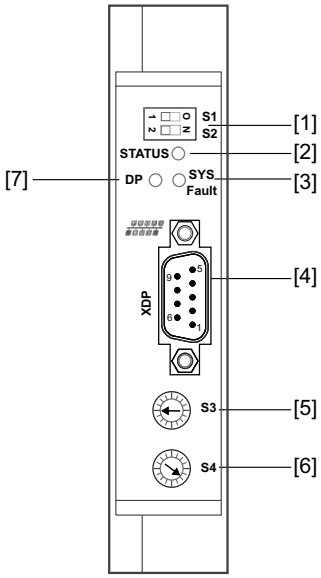
[1] X49 CANopen connection

3.7.2 UCS26B



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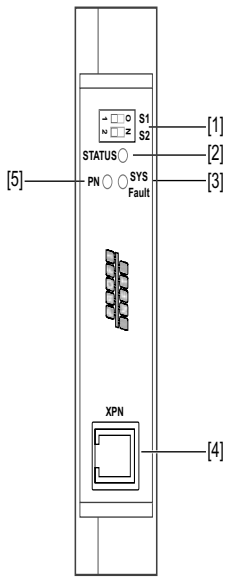
[1]	S1	DIP switch: Backplane bus termination
	S2	DIP switch: PROFIBUS termination
[2]	STATUS	LED display: Indicates the system state
[3]	SYSFault	LED display: Status of internal communication with basic module
[4]	XDP	PROFIBUS connection
[5]	S3	Address switch for PROFIBUS address: High Byte setting
[6]	S4	Address switch for PROFIBUS address: Low Byte setting
[7]	DP	LED display: PROFIBUS communication state

3.7.3 UCS27B



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[1]	S1	DIP switch: Backplane bus termination
	S2	DIP switch: No function
[2]	STATUS	LED display: Indicates the system state
[3]	SYSFault	LED display: Status of internal communication with basic module
[4]	XPN	PROFINET connection
[5]	PN	LED display: PROFIBUS communication state

4 Mechanical Installation

NOTICE

Observe the following points to prevent MOVISAFE® UCS..B from being damaged:

Switch off the power supply before you install or remove MOVISAFE® UCS..B.

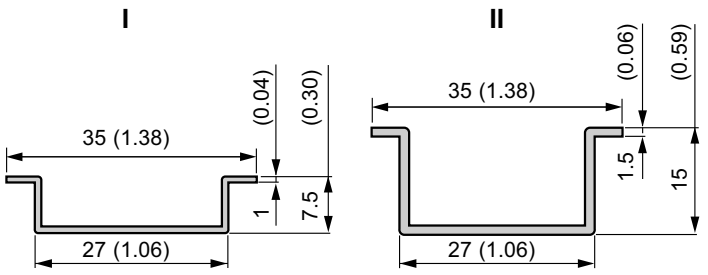
4.1 General installation notes

INFORMATION

- The individual safety modules are mounted directly to a profile rail.
- Install the units only vertically. Do not install the units horizontally, tilted or upside down.
- Observe the degree of protection of the safety modules (IP20) when installing MOVISAFE® UCS..B in a control cabinet.
- The control cabinet must have at least degree of protection IP54.
- Leave a clearance of 10 mm to the top and the bottom to allow for adequate cooling of the safety modules. Make sure air can circulate freely.
- There is no need for clearance at the sides of the unit.
- Route the cables for connecting digital inputs and contact monitoring functions separately from each other.
- Observe the permitted ambient temperature of 0 – 50 °C.
- A backplane bus connector is required when expanding a basic module with an expansion module. The necessary backplane bus connectors are installed in the profile rail before mounting the modules.
- The safety modules that are to be connected via backplane bus must be mounted directly next to one another. Gaps between the modules are not permitted, else the backplane bus will be interrupted.
- A safety module is not properly installed and electrically connected until it locks in place in the backplane connector.

4.2 Dimension drawing of the standard profile rail

You can use the following 35 mm standard profile rail (see the following figure) for installation. SEW-EURODRIVE recommends to use version II to ensure sufficient space for the retaining screws of the profile rail under the backplane bus connector when using an expansion module.



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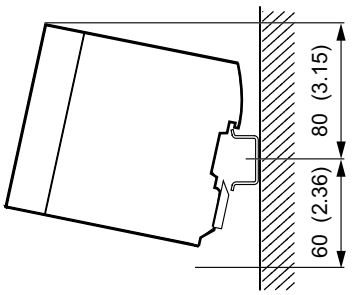
All dimensions in mm (in).

4.3 Installation clearance

Observe the following installation clearances to facilitate assembly and disassembly, and to ensure air circulation.

4.3.1 Installation clearance without backplane bus connector

Ensure a minimum clearance of 80 mm above and 60 mm below the middle of the profile rail when installing the safety modules.



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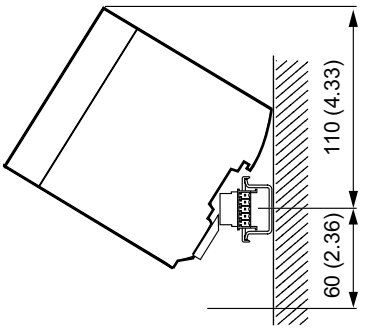
All dimensions in mm (in).

4.3.2 Installation clearance with backplane bus connector

Ensure a minimum clearance of 110 mm above and 60 mm below the middle of the standard profile rail when installing the safety modules.



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All dimensions in mm (in).

INFORMATION

Observe the excess length of the backplane bus connector on the left when installing expansion modules. This results in a distance of 7 mm to the next unit (e.g. contactor, relay).

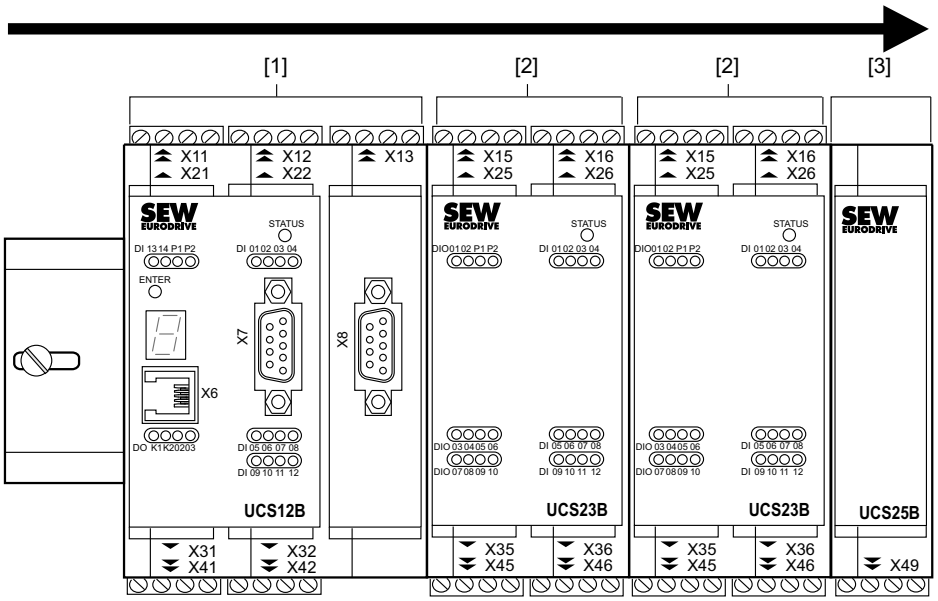
4.4 Expansion of the basic modules

INFORMATION

- The expansion modules must always be installed to the right of the basic module. An expansion with another basic module is not permitted.
- You must register the expansion modules in the MOVISAFE® Config UCS compact software (see chapter "Addressing an expansion module").
- When using expansion modules, the PFH value of the overall logic (basic module with expansion module) must be determined for a safety assessment.
- For the PFH values of the modules, refer to chapter "Technical Data".

4.4.1 Maximum stage of expansion without PROFIsafe option (/PS)

You can add a maximum of two expansion modules [2] and one diagnostic module [3] horizontally next to one basic module [1] (see following figure).



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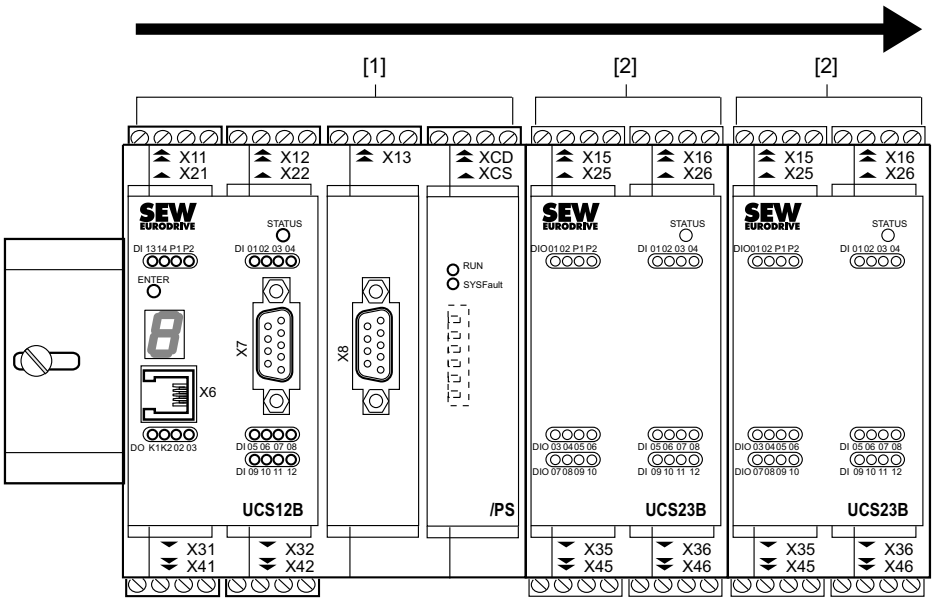
4.4.2 Maximum stage of expansion with PROFIsafe option (/PS)

You can add a maximum of two expansion modules [2] horizontally next to one basic module [1] (see following figure).



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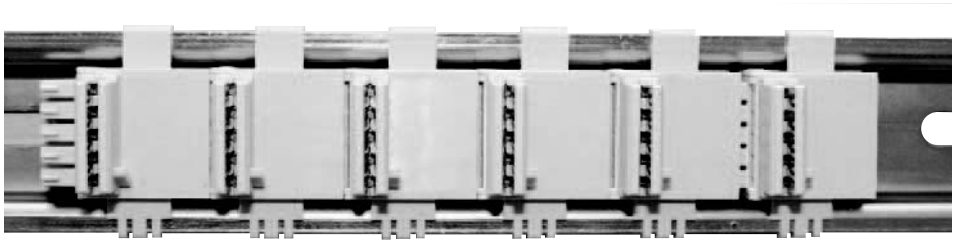
4.4.3 Backplane bus connector

The backplane bus connectors (see following figure) are expandable, 5-pole plug connectors with spring contacts. If an expansion module is added to a basic module, communication between the safety modules is routed via the backplane bus.

The width of a backplane bus connector corresponds to a pitch of 25 mm. You can combine multiple backplane bus connectors to individually adapt the length of the backplane bus to the overall system.

Before mounting the safety modules, plug the backplane bus connectors onto the profile rail. When mounting the safety modules to the profile rail, contact is established with the backplane bus. The individual safety module slots are indicated by guide rails.



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The following table shows the number of required backplane bus connectors:

MOVISAFE® basic module	Without expansion	Number of required backplane bus connectors for expansion with		
		1 × UCS23B	2 × UCS23B	1 × UCS25B/26B/27B
UCS10B	No backplane bus connector required	4	6	3
UCS11B		4	6	3
UCS12B		5	7	4
UCS10B/PS		5	7	4
UCS11B/PS		5	7	4
UCS12B/PS		6	8	5

INFORMATION

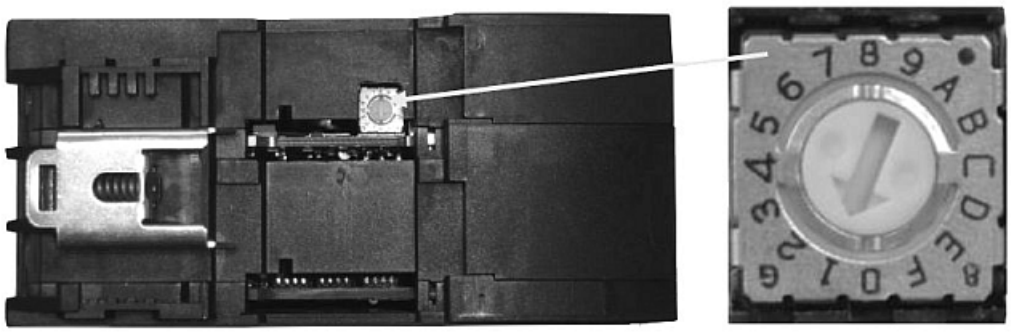
- When using a basic module without expansion, the backplane bus connector is not required.
- In case of expansion, all backplane bus slots of the safety modules to be connected must be used.

4.4.4 Addressing an expansion module

Before you can use an expansion module, you have to assign an address to it and register this address in the MOVISAFE® Config UCS compact software.

The address is assigned via the address switch at the bottom of the expansion module (see following figure). Use the following addresses:

- Basic module: Address 0 (reserved)
- 1st expansion module: Address 1
- 2nd expansion module: Address 2



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INFORMATION

If the set address does not correspond to the configured address, MOVISAFE® UCS..B triggers an alarm.

4.4.5 Step-by-step instruction for installing MOVISAFE® UCS..B

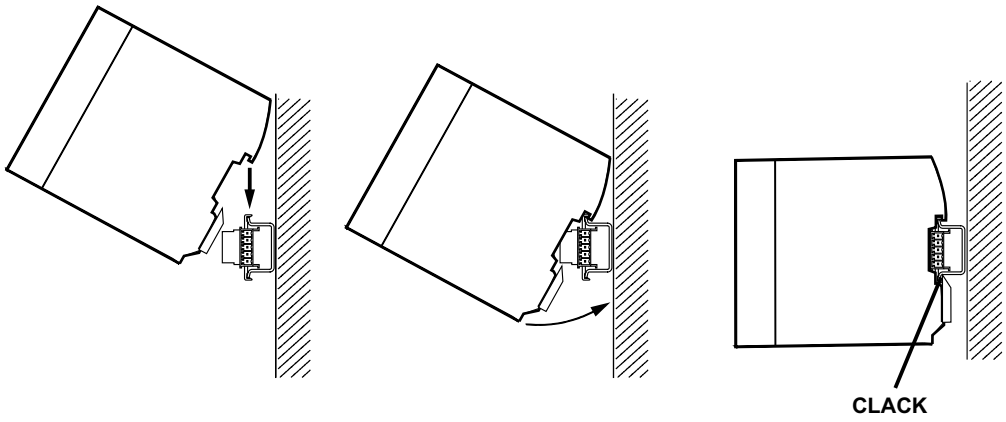
Proceed as follows:

NOTICE

Observe the following points to prevent MOVISAFE® UCS..B from being damaged:

Switch off the power supply before you install/remove MOVISAFE® UCS..B to/from the backplane bus connectors.

1. Assemble the profile rail. Adhere to the specified installation clearances.
2. Insert the backplane bus connector into the profile rail until it locks in place. The spring contacts protrude from the profile rail.
3. Plug in the basic module farthest left. Next plug in the required expansion modules to the right of the basic module.
4. Place the module you want to install from top at an angle of approx. 45 onto the profile rail. Move the safety module downwards until it locks in place on the profile rail (see following figure). Only then will the module be properly connected with the backplane bus.



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4.4.6 Step-by-step instruction for removing MOVISAFE® UCS..B

Proceed as follows to remove a module:

NOTICE

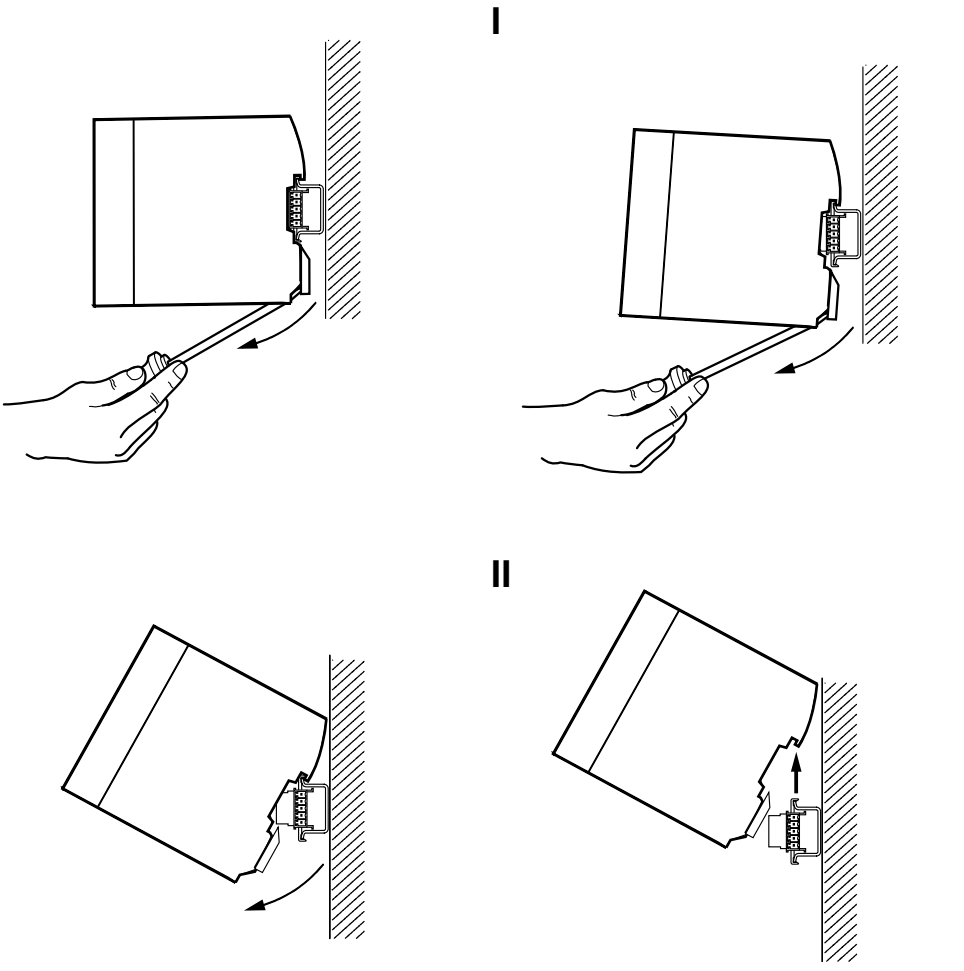
Observe the following points to prevent MOVISAFE® UCS..B from being damaged:

Switch off the power supply before you install/remove MOVISAFE® UCS..B to/from the backplane bus connectors.

INFORMATION

The backplane bus is interrupted by removing MOVISAFE® UCS..B.

1. The housing of the safety module is fitted with a spring-loaded clip at the bottom by which the module can be removed from the rail.
2. Insert a suitable screwdriver into the slot. The safety module is unlocked (see following figure, pos. I).
3. First slew the safety module to the front, then lift it upwards (see the following figure, pos II).



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5 Electrical Installation

5.1 Connection and terminal description of the basic modules

5.1.1 Part numbers

- MOVISAFE® UCS10B: 1822 235 8
- MOVISAFE® UCS11B: 1822 236 6
- MOVISAFE® UCS12B: 1822 237 4
- MOVISAFE® UCS10B/PS: 1823 629 4
- MOVISAFE® UCS11B/PS: 1823 630 8
- MOVISAFE® UCS12B/PS: 1823 631 6

5.1.2 Description of terminals and LEDs

INFORMATION

The following table lists all elements of the MOVISAFE® UCS..B safety modules. Observe the type specific differences of the individual safety modules (see chapter "Unit structure").

Description	LED/terminal	Function
LED STATUS:	**STATUS**	The LED shows the status of MOVISAFE® UCS..B (see chapter "Meaning of the LEDs").
LED IN 01 – 14	**01 – 14**	The LEDs show the status of the binary input (see chapter "Operating states").
LED P1, P2	**P1, P2**	The LEDs show the status of the pulse output (see chapter "Operating states").
LED K1, K2	**K1, K2**	The LEDs show the status of the relay output (see chapter "Operating states").
LED OUT 02 – 03	**02, 03**	The LEDs show the status of the binary output (see chapter "Operating states").
RUN LED	**RUN**	The LED shows the operating state of the communication interface (see chapter "Meaning of the LEDs").
LED SYS-FAULT	**SYS-FAULT**	The LED shows the connection state of the communication interface (see chapter "Meaning of the LEDs").
7-segment display		The number show the status of the module (see chapter "Meaning of the 7-segment display").
Function key	**ENTER**	Error reset and display of the CRC in status "4".
X6: Connection for service interface	**X6**	Service interface for point-to-point connection (e.g. UWS21B, USB11A).
X7, X8: Connection for TTL, SIN/COS or SSI absolute encoders	**X7 (X8):1–9**	Assignment depends on connected encoder (see chapter "Technical Data").
X11: Power supply connection	**X11:1**	DC 24 V
	X11:2	DC 24 V
	X11:3	Reference potential 0V24
	X11:4	Reference potential 0V24
X12: Connection for encoder supply voltage for encoder interface X7	**X12:1 U_ENC_1**	Encoder supply voltage for encoder interface X7
	X12:2 GND_ENC_1	Reference potential for encoder supply voltage
	X12:3 DO 0.00	Auxiliary output 1
	X12:4 DO 0.01	Auxiliary output 2

Description	LED/terminal	Function
X13: Connection for encoder supply voltage for encoder interface X8	**X13:1 U_ENC_2**	Encoder supply voltage for encoder interface X8
	X13:2 GND_ENC_2	Reference potential for encoder supply voltage
	X13:3 N.C.	
	X13:4 N.C.	
X21: Connection for binary inputs and pulse outputs	**X21:1 DI 0.13**	Binary input 13 (suitable for OSSD)
	X21:2 DI 0.14	Binary input 14 (suitable for OSSD)
	X21:3 P1	Pulse signal 1 for crossfault monitoring
	X21:4 P2	Pulse signal 2 for crossfault monitoring
X22: Connection for binary inputs	**X22:1 DI 0.01**	Binary input 1 (suitable for OSSD)
	X22:2 DI 0.02	Binary input 2 (suitable for OSSD)
	X22:3 DI 0.03	Binary input 3 (suitable for OSSD)
	X22:4 DI 0.04	Binary input 4 (suitable for OSSD)
X31: Connection for binary outputs	**X31:1 DO 0.02_P**	HISIDE output 2
	X31:2 DO 0.02_M	LOSIDE output 2
	X31:3 DO 0.03_P	HISIDE output 3
	X31:4 DO 0.03_M	LOSIDE output 3
X32: Connection for binary inputs or HTL incremental encoder	**X32:1 DI 0.05**	Binary input 5 / HTL proximity sensor input
	X32:2 DI 0.06	Binary input 6 / HTL proximity sensor input
	X32:3 DI 0.07	Binary input 7 / HTL proximity sensor input
	X32:4 DI 0.08	Binary input 8 / HTL proximity sensor input
X41: Connection for relay outputs	**X41:1 K 0.11**	Relay output 1
	X41:2 K 0.12	
	X41:3 K 0.21	Relay output 2
	X41:4 K 0.22	
X42: Connection for binary inputs	**X42:1 DI 0.09**	Binary input 9 (suitable for OSSD)
	X42:2 DI 0.10	Binary input 10 (suitable for OSSD)
	X42:3 DI 0.11	Binary input 11 (suitable for OSSD)
	X42:4 DI 0.12	Binary input 12 (suitable for OSSD)
XCS: Connection for CAN-S (PROFIsafe)	**XP:1 CAN_High**	CAN-S (PROFIsafe), CAN High
	XP:2 CAN_Low	CAN-S (PROFIsafe), CAN Low
	XP:3 DGND	CAN-S (PROFIsafe), CAN reference potential
	XP:4 120 Ω	CAN-S termination
XCD: Connection for CAN (standard)	**XS:1 CAN_High**	CAN (Standard), CAN High
	XS:2 CAN_Low	CAN (Standard), CAN Low
	XS:3 DGND	CAN (Standard), CAN reference potential
	XS:4 120 Ω	CAN termination

5.2 Connection and terminal description for UCS23B expansion module

5.2.1 Part number

MOVISAFE® UCS23B: 1822 241 2

5.2.2 Description of terminals and LEDs

Description	LED/terminal	Function
LED STATUS:	**STATUS**	The LED shows the status of MOVISAFE® UCS23B (see chapter "Meaning of the LEDs").
LED IN 01 – 12	**DI X.01 – 12**	Status of the respective binary input
LED P1, P2	**P1, P2**	Status of the pulse output
LED I/O 01 – 10	**DIO X.01 – 10**	Status of the respective binary input or output
X15: Power supply connection	**X15:1**	DC 24 V
	X15:2	DC 24 V
	X15:3	Reference potential 0V24
	X15:4	Reference potential 0V24
X16: Auxiliary output connection	**X16:1 N.C.**	
	X16:2 N.C.	
	X16:3 DO X.00	Auxiliary output 1
	X16:4 DO X.01	Auxiliary output 2
X25: Connection Binary inputs/outputs and pulse outputs	**X25:1 DIO X.01**	Configurable binary input/output 1 (suitable for OSSD)
	X25:2 DIO X.02	Configurable binary input/output 2 (suitable for OSSD)
	X25:3 P1	Pulse output 1 for crossfault monitoring
	X25:4 P2	Pulse output 2 for crossfault monitoring
X26: Binary input connection	**X26:1 DI X.01**	Binary input 1 (suitable for OSSD)
	X26:2 DI X.02	Binary input 2 (suitable for OSSD)
	X26:3 DI X.03	Binary input 3 (suitable for OSSD)
	X26:4 DI X.04	Binary input 4 (suitable for OSSD)
X35: Connection Binary inputs/outputs	**X35:1 DIO X.03**	Configurable binary input/output 3 (suitable for OSSD)
	X35:2 DIO X.04	Configurable binary input/output 4 (suitable for OSSD)
	X35:3 DIO X.05	Configurable binary input/output 5 (suitable for OSSD)
	X35:4 DIO X.06	Configurable binary input/output 6 (suitable for OSSD)
X36: Binary input connection	**X36:1 DI X.05**	Binary input 5
	X36:2 DI X.06	Binary input 6
	X36:3 DI X.07	Binary input 7
	X36:4 DI X.08	Binary input 8
X45: Connection Binary inputs/outputs	**X45:1 DIO X.07**	Configurable binary input/output 7 (suitable for OSSD)
	X45:2 DIO X.08	Configurable binary input/output 8 (suitable for OSSD)
	X45:3 DIO X.09	Configurable binary input/output 9 (suitable for OSSD)
	X45:4 DIO X.10	Configurable binary input/output 10 (suitable for OSSD)
X46: Binary input connection	**X46:1 DI X.09**	Binary input 9 (suitable for OSSD)
	X46:2 DI X.10	Binary input 10 (suitable for OSSD)
	X46:3 DI X.11	Binary input 11 (suitable for OSSD)
	X46:4 DI X.12	Binary input 12 (suitable for OSSD)

INFORMATION

- X = 1: 1st expansion module
- X = 2: 2nd expansion module

5.3 Connection and terminal description of diagnostic modules

5.3.1 Part numbers

MOVISAFE® UCS25B: 1822 243 9

MOVISAFE® UCS26B: 1824 974 4

MOVISAFE® UCS27B: 1824 975 2

5.3.2 Description of terminal functions

Description	LED/terminal/ DIP switch	Function
LED status	**STATUS**	The LED shows the state of a diagnostic module (see chapter "Meaning of the LEDs").
LED SYSFault	**SYSFault**	The LED shows the connection state of the communication interface (see chapter "Meaning of the LEDs").
DP LED	**DP**	The LED shows the connection state with PROFIBUS (see chapter "Meaning of the LEDs").
PN LED	**PN**	The LED shows the connection state with PROFINET (see chapter "Meaning of the LEDs").
DIP switch S1: Backplane bus termination (with UCS26B and UCS27B)	**S1: ON** **S1: OFF**	Backplane bus termination enabled Backplane bus termination disabled
DIP switch S2: PROFIBUS termination (only with UCS26B)	**S2: ON** **S2: OFF**	Termination on PROFIBUS enabled Termination on PROFIBUS disabled
DIP switches S3 and S4: Address switch for setting the PROFIBUS address (only with UCS26B)	**S3: High Byte** **S4: Low Byte**	Address switch for PROFIBUS address: High Byte setting Address switch for PROFIBUS address: Low Byte setting
X49: CAN connection	**X49:1 CAN_High** **X49:2 CAN_Low** **X49:3 DGND** **X49:4 N.C.**	CAN High CAN Low CAN reference potential -
XDP: PROFIBUS connection	**XDP**	PROFIBUS fieldbus interface (see chapter "Technical Data").
XPN: PROFINET connection	**XPN**	PROFINET fieldbus interface (see chapter "Technical Data").

5.4 Installation

5.4.1 Installation notes

The cable length for the binary inputs and outputs must usually not exceed 30 m.

If the cable length exceeds 30 m, you must provide for measures to prevent unacceptable overvoltages. Appropriate measures include, for example, lightning protection for outer conductors, overvoltage protection of the plant on the inside as well as a protected cable routing.

5.4.2 Measures for electromagnetic compatibility (EMC)

MOVISAFE® UCS..B is designed for use in industrial applications (based on the EMC test specifications EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-6 and EN 61000-6-2). MOVISAFE® UCS..B safety modules can be installed in a control cabinet together with inverter technology without any problems. Prerequisite for safe installation is that the electromagnetic compatibility of the entire system is ensured by taking appropriate measures. The following measures ensure designated operation of the safety modules:

- Make sure that the MOVISAFE® voltage supply cables and the converter's "switching cables" are routed separately.
- Route the converter's signal cables, bus cables and power cables in separate cable ducts. The minimum distance between the cable ducts should be 10 mm.
- Route the cables for addressing the binary inputs and contact monitoring separately from one another.
- All contactors in the immediate vicinity of the safety modules must be equipped with appropriate suppressors or protective diodes.
- Make sure that the converter technology in the immediate vicinity of the safety modules complies with the EMC guidelines. Check the routing and design of the shielding for the motor cable and braking resistor connection. Follow the installation guidelines of SEW-EURODRIVE for inverters technology.
- Note the following when connecting position and speed sensors:
  - Use shielded cables only. The cable for transmitting signals must be suitable for EIA485 standard (formerly RS485).
  - Make sure the shield is connected properly in the 9-pole D-sub connectors of the position and velocity sensors and on the sensor end of the cable.
  - For splitting the signals of position and speed sensors, use prefabricated cables from SEW-EURODRIVE or the DAE70B/71B encoder signal split box (see chapter "Optional cables for connecting an encoder system").
- Observe the following points for connection to a fieldbus system:
  - Use only shielded cables.
  - Use only connectors with a metal housing or a metalized housing.
  - Connect the shielding in the connector over a wide surface area.
  - Apply the shielding of the bus cable on both ends.
  - Avoid using plug connectors to extend fieldbus cables.

5.5 Voltage supply of the safety modules

The MOVISAFE® UCS..B safety modules require external voltage supply of DC 24 V (see SELV or PELV, EN 50178). The following conditions must be taken into account for project planning and installation of the power supply unit:

- It is essential that you observe the minimum and maximum tolerance of the supply voltage.

	Tolerance	
	Minimum (-15%)	**Maximum (+15%)**
Nominal voltage = DC 24 V	DC 24 V -15 % = DC 20.4 V	DC 24 V +15 % = DC 27.6 V

- To achieve a rather low residual ripple of the supply voltage, we recommend using a 3-phase power supply unit or an electronically controlled unit. The power supply unit must meet the requirements in EN 61000-4-11 (voltage dip).
- The internal voltage supply supplies the internal electronics of the safety modules. When using encoders, the encoder voltage supply must be provided separately (see chapter "Voltage supply for encoder systems).
- Always ensure safe electrical isolation against the voltage supply system (e.g. AC 230 V). For this purpose, select power supply units that comply with DIN VDE0551, EN 60742 and DIN VDE0160. When selecting the unit, make sure it has equipotential bonding between PE and DC 0 V on the secondary side.
- Fuse the safety modules individually on the primary side with max. 2 A. SEW-EURODRIVE recommends using type Z circuit breakers or miniature fuses, "flink" characteristics. Observe local regulations when dimensioning the connection cables.
- The external voltage insulation strength of the MOVISAFE® UCS..B safety modules is DC 32 V (fused with suppressor diodes at the input).

5.6 Binary input connection

MOVISAFE® UCS..B is equipped with safe binary inputs. They are suited for connecting 1 or 2-channel sensors, partly with output signal switching device (OSSD) according to EN 61131-2 type 2. The OSSD capability of an input is listed in chapters "Plug connectors of basic module" and "Plug connectors of expansion module".

The connected signals must have a "High" level of DC 24 V (DC +15 V to DC +30 V) and a "Low" level of DC 0 V (DC −3 V to DC +5 V). The inputs are equipped with input filters.

Generally, the binary inputs are designed for safety-related use only in combination with pulse outputs (see chapter "Using pulse outputs").

If you do not use the pulse outputs, you must provide for external measures, especially an appropriate cable routing, to prevent a short circuit in the external wiring between different inputs and against the supply voltage of the UCS..B safety modules.

Each binary input of MOVISAFE® can be configured separately for the following signal sources:

- Digital input is assigned to pulse P1 of the same module
- Digital input is assigned to pulse P2 of the same module
- Digital input is assigned to DC 24 V continuous voltage

An internal diagnostic function checks cyclically whether the binary functions, including the input filters, are working properly. When a fault is detected, MOVISAFE® goes into alarm status. At the same time, all MOVISAFE® outputs are disabled (see chapter "Diagnostics").

INFORMATION

Triggered safety functions or alarm messages can be acknowledged by pressing the "ENTER" button on MOVISAFE® or via a configurable reset at the binary input. Error messages can only be acknowledged by switching MOVISAFE® off and then on again. All error and alarm messages are included in the MOVISAFE® Config UCS compact software interface.

Depending on the required performance level, you can use binary inputs individually or combined in groups. The MOVISAFE® Config UCS compact software interface provides various, predefined input elements for this purpose (see chapter "Description of input elements").

MOVISAFE® UCS..B ensures comprehensive diagnostic functions for the input subsystem to achieve as high as possible DC values (**D**iagnostic **C**overage). These functions are executed permanently or optionally (cross fault monitoring by means of pulse detection). You can use the DC values for the input sensors given in chapter "Diagnostic values" for a safety-relevant evaluation of the overall system.

Binary inputs of the basic and expansion module:

Binary inputs	Achievable performance level (PL)	Comment
DI X.01 to DI X.04 DI X.01 to DI X.04	PL e	Suitable for all kinds of input elements with or without pulse, achievable PL, depending on $MTTF_d$ of the input elements and error eliminations in the external wiring.
DI X.05 to DI X.08	PL e	1-channel with pulse: • Predominantly high-level required ($T_{High} > 100 \times T_{Low}$) • At least one request/day due to the application • Error detection on request
	PL d	1-channel without pulse: • Short circuit fault exclusion between the signals and after V_{CC} • Error detection on request
	PL e	2-channel: • At least one request/day due to the application • Error detection on request
DI X.13, DI X.14	PL e	Use of pulse 1 and pulse 2
	PL d	Without pulse/with pulse 1 or pulse 2 on both inputs. Error detection on request.

Binary input on the expansion module (DIO configured as input):

Binary inputs	Achievable performance level (PL)	Comment
DIO X.01 to DIO X.10 (only UCS23B)	-	Without pulse, 1-channel static signal (auxiliary input)
	PL e	Without pulse, 2-channel static signal • At least one request/day due to the application • Error detection only on request
	PL d	2-channel without pulse, static signal • Less than one request/day due to the application • Error detection on request
	PL e	1-channel with pulse • Predominantly High-level required ($T_{High} > 100 \times T_{Low}$) • At least one request/day due to the application • Error detection on request
	PL d	1-channel with pulse • Less than one request/day
	PL e	2-channel with pulse 1 and pulse 2

INFORMATION

- X = 0: Basic module
- X = 1: 1st expansion module
- X = 2: 2nd expansion module

5.6.1 Using pulse outputs

In addition to the binary inputs, MOVISAFE® UCS..B offers two pulse outputs (P1 and P2) at the basic module and at each expansion module. The pulse outputs are DC 24 V outputs that are intended exclusively for monitoring the binary inputs of the respective module. The pulse outputs must not be used for other functions within the application. The frequency of the two pulse outputs P1 and P2 is 125 Hz each.

Observe the following points during project planning:

- The connected cables must not exceed the maximum length of 30 m, and the maximum permitted total current for the pulse outputs must not exceed 250 mA.
- Pulse P1 and pulse P2 must be used for one specific module each. It is not possible to mix the pulses of basic modules and expansion modules.

INFORMATION

Without using pulsing, the binary inputs can be connected as follows:

- With single-channel, self-monitoring sensors, you can establish structures up to category 2. This means you can achieve a performance level in accordance with EN ISO 13849-1.
- With dual-channel sensors without function test within 24 hours, you can establish structures up to category 3. This means you can achieve a performance level in accordance with EN ISO 13849-1.
- With dual-channel sensors and function test within 24 hours, you can establish structures up to category 4. This means you can achieve a performance level in accordance with EN ISO 13849-1.
  Note that external measures, particularly suitable cable routing, must be taken to prevent short circuits in the external wiring between different inputs and against the supply voltage of MOVISAFE® UCS..B.

5.7 Connecting the outputs

5.7.1 General information

MOVISAFE® UCS..B offers outputs at the basic module and at the expansion modules. Comprehensive diagnostics functions in the output subsystem ensure high DC values.

Make sure that elements for switching amplification, such as relays, contactors, etc., are included in the switch-off circuit. You can use the DC values for the output sensors in chapter "Diagnostic values" for a safety-relevant evaluation of the overall system.

If the unit-internal diagnostic function is enabled, it will cyclically check the binary outputs for proper functioning. During this plausibility check, the binary output is switched to its inverse value for the duration of the check (< 500 µs). This means a P binary output is briefly switched to DC 0 V potential, and an M binary output is briefly switched to DC 24 V potential. No diagnostics at the auxiliary outputs.

The relay outputs are checked for plausibility during each switching cycle. The relay outputs have to be tested (switched) cyclically to maintain the safety function. A test should be performed at least once per year. For increased demands, the test cycle is to be determined based on the application.

Auxiliary outputs at the basic or expansion module are not tested and are not permitted for safety technology applications.

For the 10 safe binary outputs of the expansion modules, you can enable or disable the internal diagnostics function via the MOVISAFE® Config UCS compact software.

Following a description of the meaning of "dynamic" and "static" in the dialog window of the "UCS23B multi-unit configuration":

- Dynamic

  means that the internal diagnostics function at the output is enabled. Using the output with touch probe inputs may cause an unintended switching and is thus prohibited. This includes, for example, the binary inputs of the frequency inverters.

- Static

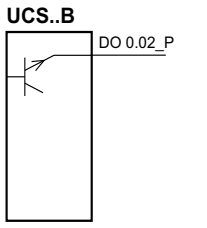
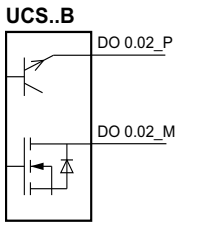
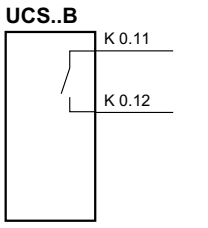
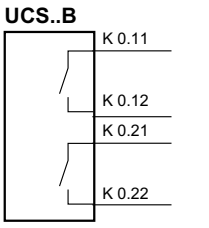
  means that the internal diagnostics function at the output is disabled. This allows for using the output with touch probe inputs.

INFORMATION

- Cross and short circuits in the external wiring of the binary outputs are not detected. For safe outputs, cross faults and short circuit therefore have to be prevented according to EN ISO 13849-2 table D.4.
- For a safety assessment of switching amplifiers in the switch-off circuit, e.g. relay or contactor, the manufacturer's specification ($MTTF_d$ value, FIT value, $B10_d$ value, etc.) must be used.
- When used for safety purposes, the proper functioning of switching amplifiers, e.g. relays or contactors, must be monitored via suitable feedback contacts.
- Fault exclusions are permitted according to the relevant standards. The effective peripheral conditions must be permanently ensured.
- If an error is detected, MOVISAFE® UCS..B switches to alarm/error state and indicates this state (see chapter "Diagnostics").
- If you use switching amplification elements in safety circuits, you must monitor their functionality via suitable feedback contacts etc. Suitable feedback contacts are contacts that are connected with the contacts in the cut-off circuit in a forced-switching manner.
- The switching capacity of the external switching amplifiers must be tested cyclically. The test interval must be specified by the application based on request and ensured via suitable measures. Suitable measures can be organizational (power off/on at the start of the shift) or technical (automatic, cyclical switching).
- Observe the DC values as well as corresponding conditions (see chapter "Diagnostics values").
- Applications with frequent request of the safe disconnection should be tested at brief intervals, e.g. at the start of the shift once a day. However, a test should be performed cyclically once a year.
- The diagnostics function of the outputs is performed in group control and single control. The standard outputs are not tested.
- The outputs High Side (DO 0.02_P, DO 0.03_P) and Low Side (DO 0.02_M, DO 0.03_M) must not be used individually for safety tasks. Use for safety tasks is only permitted in High Side/Low Side combination.

5.7.2 Connection of outputs at the basic module

Depending on the required performance level, you can use the binary or relay outputs individually or combined in groups.

P switching binary output	P and M switching binary output	Relay output	Relay output
 9007202063625099	 9007202063628043	 9007202063630987	 9007202063633931

Output	Output type	Achievable performance level (PL)	Requirements
DO 0.00 to DO 0.01	Auxiliary output	-	-
DO 0.02_P with DO 0.02_M	Binary output, 2-channel	PL e	-
DO 0.02_P	Auxiliary output	-	-
DO 0.02_M	Auxiliary output	-	-
DO 0.03_P with DO 0.03_M	Binary output, 2-channel	PL e	-
DO 0.03_P	Auxiliary output	-	-
DO 0.03_M	Auxiliary output	-	-
K 0.1 with K 0.2	Relay output, 2-channel	PL e	-
K 0.1	Auxiliary output	-	-
K 0.2	Auxiliary output	-	-

INFORMATION

- For safety-relevant applications, use only external switching elements with a minimum holding current of > 1.2 mA.
- Cross and short circuits in the external wiring of the binary outputs are not detected. For safe outputs, cross faults and short circuit therefore have to be prevented according to EN ISO 13849-2 table D.4.

Using safe outputs to control safe stop

The safe binary outputs or safe relay outputs can be used to control the safe stop function of MOVIDRIVE® B, MOVITRAC® B (X17) and MOVIAXIS® (X7/X8) (see following figures).

NOTICE

Power input at terminal X17 of MOVIDRIVE® B and MOVITRAC® B too high.

Parts of MOVISAFE® could be destroyed, or malfunctions of the safe stop could be the result.

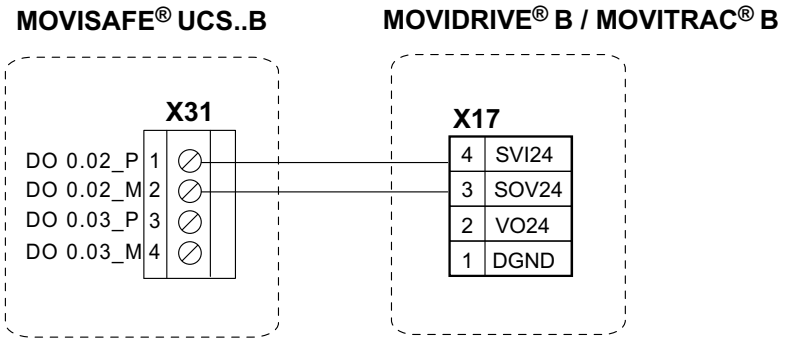
Note the specific power input at terminal X17 of MOVIDRIVE® B and MOVITRAC® B. It is listed in the "Functional Safety" manual for the respective product.

Using safe binary outputs

INFORMATION

The outputs DO 0.02_P/_M and DO 0.03_P/_M can drive a maximum of the following units irrespective of the required current:

- 2 MOVIDRIVE® B
- 2 MOVITRAC® B
- 2 MOVIDRIVE® B and 2 safety-related BST brake modules
- 2 MOVITRAC® B and 2 safety-related BST brake modules



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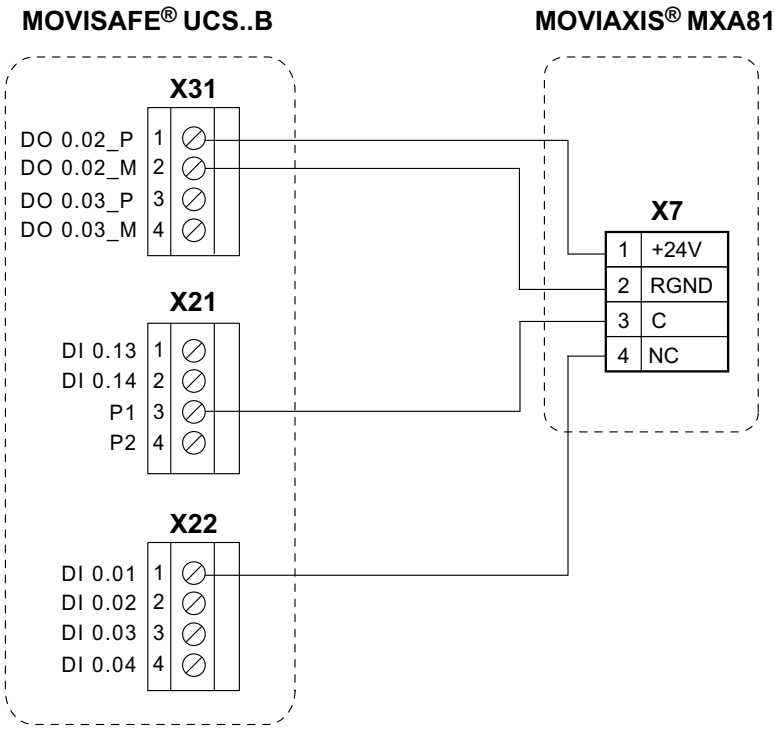

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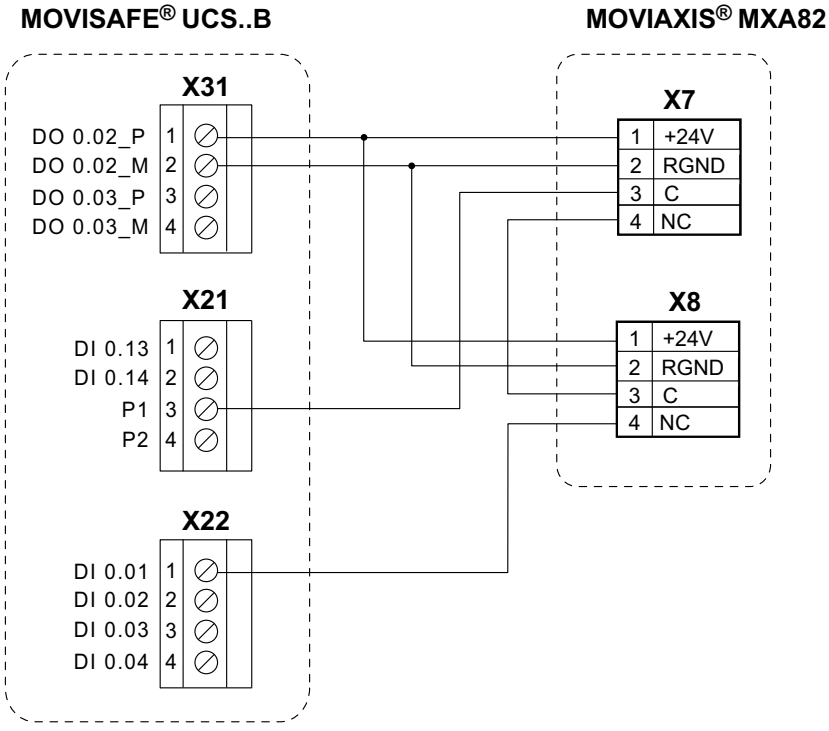

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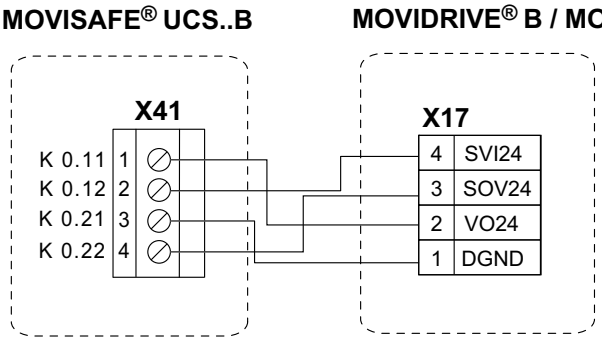
Using safe relay outputs



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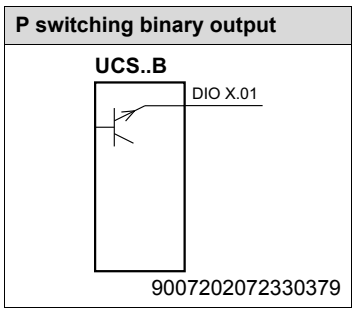
5.7.3 Connection of outputs at the expansion module

Depending on the required performance level, you can connect binary outputs via one or two channels.



Output	Output type	Achievable performance Level (PL)	Requirements
DO X.01 to DO X.02	Auxiliary output	-	-
DIO X.01 to DIO X.10	Binary output, 1-channel, static	PL c	Error detection/error response according to cat. 2
	Binary output, 2-channel, static	PL e	Outputs of different groups.
	Binary output, 2-channel, static	PL d	Outputs of the same group with short circuit fault exclusion at both outputs.
	Binary output, 1-channel, dynamic	PL d	-
	Binary output, 2-channel, dynamic	PL e	-

- The configurable binary outputs are assigned groups internally:
  - Group 1: DIO X.01 to DIO X.06
  - Group 2: DIO X.07 to DIO X.10
- X = 1: 1st I/O expansion module
- X = 2: 2nd I/O expansion module

INFORMATION

- For safety-relevant applications, use only external switching elements with a minimum holding current of > 1.2 mA.
- Cross and short circuits in the external wiring are not detected. For safety outputs, cross faults and short circuit must be excluded according to EN ISO 13849-2, table D.4.

5.8 Connecting the position and velocity sensors

5.8.1 Before you start

NOTICE

Do not plug in or remove encoder connections during operation.

Doing so can cause irreparable damage to the electrical components on the encoder.

De-energize connected encoders and MOVISAFE® UCS..B **before** you plug in or remove the encoder connections.

For fault detection in the encoder system, there are several diagnostics measures implemented in the MOVISAFE® UCS..B depending on the selected encoder configuration. They are activated automatically when selecting the encoder type and the encoder combination in the MOVISAFE® Config UCS compact software interface. You can use the diagnostic coverage values for the encoder sensors in chapter "Diagnostic values" for a safety-relevant evaluation of the overall system.

INFORMATION

- Observe the notes in chapter "General installation notes for encoders" and "Voltage supply for encoder systems".
- The activation on the position processing requires at least one SSI absolute encoder.
- All monitoring functions use an internal digit format for the input fields. This may automatically convert the entered values to the internal digit format.

5.8.2 General installation notes for encoders

- Observe the notes in chapter "Measures for electromagnetic compatibility (EMC)".
- Maximum length of encoder cables:

  100 m (328 ft) with a capacitance per unit length ≤ 120 nF/km.
- Core cross section: 0.2 – 0.5 mm (AWG25 – AWG21)
- Use shielded cables with twisted pair conductors and make sure they are grounded on both ends over a large surface area:
  - at the encoder in the cable gland or in the encoder plug
  - in the housing of the D-sub connector or
  - at the metal clamp / strain relief at the bottom of the inverter
  - at the equipotential bonding
- With single encoders, you have to provide at least for a fault exclusion for the mechanic structure.
- With two encoders, the encoders must not impact on each other. This refers to both the electrical and mechanical part.
- The mechanical connection of the encoder must be positive and must not comprise wearing parts (chains, tooth belts etc.).
- If you use two encoders, you have to configure the encoder with the higher resolution as encoder 1 (process encoder), and the encoder with the lower resolution as encoder 2 (reference encoder).

5.8.3 Assignment of the encoder types to the safety module

You can connect the following conventional encoder types to the safety modules depending on the respective module:

- TTL
- HTL 1Z/2Z (counting input for HTL proximity sensors)
- SIN/COS
- SSI (binary or gray code)

The connected encoders are parameterized using the MOVISAFE® Config UCS compact software interface. The following table shows the connection options of the different encoders to the corresponding encoder interfaces of the safety modules.

Safety module	Encoder interface design		
	D-sub socket		Terminal
	X7	X8	X32
UCS10B **UCS10B/PS**	-	-	-
UCS11B **UCS11B/PS**	TTL SIN/COS SSI	-	HTL 1Z or HTL 2Z
UCS12B **UCS12B/PS**	TTL SIN/COS SSI	TTL SIN/COS SSI	HTL 1Z or HTL 2Z

MOVISAFE® UCS..B detects faults of the safety-relevant signals of an encoder system. Specific diagnostics are implemented depending on the encoder configuration. For the specification of the encoder interfaces and the implemented diagnostics, refer to chapter "Specification of the encoder interfaces".

5.8.4 Combination of various encoder types

MOVISAFE® UCS..B safety modules always need two encoder signals. Whether the signals come from one or two encoders depends on the required performance level and the safety function. The encoder system is selected in the user interface of the MOVISAFE® Config UCS compact software. You can choose between a single-encoder concept and a double-encoder concept.

Single-encoder concept

Single-encoder concept means that one encoder is used to monitor the safe movement. It is not possible to use the encoder signal for controlling an inverter and for safe monitoring of the movement. In this case, use the suitable prefabricated encoder cable to split the encoder signal between inverter and safety module.

Single-encoder concepts require a safety-rated encoder.

Double-encoder concept

Double-encoder concept means that two encoders are used to monitor the safe movement. The safety module compares the two encoder signals, which reduces the requirements on the individual encoder.

Double-encoder concepts can be implemented using diverse standard encoders.

The safety functions that can be implemented are selected in the user interface of the MOVISAFE® Config UCS compact software depending on the configured encoder system.

UCS11B, UCS11B/PS		Safety function									
Encoder 1	**Encoder 2**	**SEL**	**SLP**	**SCA**	**SSX**	**SLI**	**SDI**	**SLS**	**SOS**	**PDM**	**ECS**
TTL	-			x	x	x	x	x	x	x	x
TTL	HTL 1Z			x	x			x	x	x	x
TTL	HTL 2Z			x	x	x	x	x	x	x	x
-	-										
HTL 1Z	HTL 1Z			x	x			x	x	x	x
HTL 2Z	HTL 2Z			x	x	x	x	x	x	x	x
SIN/COS	-			x	x	x	x	x	x	x	x
SIN/COS	HTL 2Z			x	x	x	x	x	x	x	x
SSI	HTL 2Z	x	x	x	x	x	x	x	x	x	x

UCS12B, UCS12B/PS (single-axis monitoring)		Safety function									
Encoder 1	**Encoder 2**	**SEL**	**SLP**	**SCA**	**SSX**	**SLI**	**SDI**	**SLS**	**SOS**	**PDM**	**ECS**
TTL	TTL			x	x	x	x	x	x	x	x
TTL	SSI	x	x	x	x	x	x	x	x	x	x
-	-										
SIN/COS	TTL			x	x	x	x	x	x	x	x
SIN/COS	SIN/COS			x	x	x	x	x	x	x	x
SIN/COS	SSI	x	x	x	x	x	x	x	x	x	x
SSI	SSI	x	x	x	x	x	x	x	x	x	x

UCS12B, UCS12B/PS (monitoring of 2 axes)[1]		Safety function									
Encoder 1	**Encoder 2**	**SEL**	**SLP**	**SCA**	**SSX**	**SLI**	**SDI**	**SLS**	**SOS**	**PDM**	**ECS**
TTL	-			x	x	x	x	x	x	x	x
TTL	HTL 1Z			x	x			x	x	x	x
TTL	HTL 2Z			x	x	x	x	x	x	x	x
-	-										
HTL 1Z	HTL 1Z			x	x			x	x	x	x
SIN/COS	-			x	x	x	x	x	x	x	x
SIN/COS	HTL 2Z			x	x	x	x	x	x	x	x
SSI	HTL 2Z	x	x	x	x	x	x	x	x	x	x

1) Selection for axis 1 and 2 identical

- There must be at least one signal from the SSI absolute encoder to activate position processing.
- When using SSI absolute encoders, bear in mind that velocities are calculated from the position signals. This is why the encoder needs a suitable resolution and reproducibility.
- In a system prone to slip, observe the assignment of the process sensor in the encoder configuration in MOVISAFE® Config UCS compact:
  - The process sensor is relevant for internal calculation and monitoring of limit values. It determines the switch-off point for the implemented safety function.

  - The reference sensor is relevant for the plausibility of encoder data. This sensor is referenced to the process sensor.

- If position processing is not enabled, the reference sensor is automatically adjusted to the process sensor. The adjustment is made cyclically after a specific distance or number of revolutions. You determine the track length until the next adjustment as follows:
  - Read the measuring length in the encoder configuration in MOVISAFE® Config UCS compact (e.g. 500 revolutions)
  - Calculate the interval for adjustment: 1/4 × measuring length

    (e.g. 1/4 × 500 revolutions = 125 revolutions)

  Result: The reference sensor is adjusted to the process sensor every 125 revolutions.

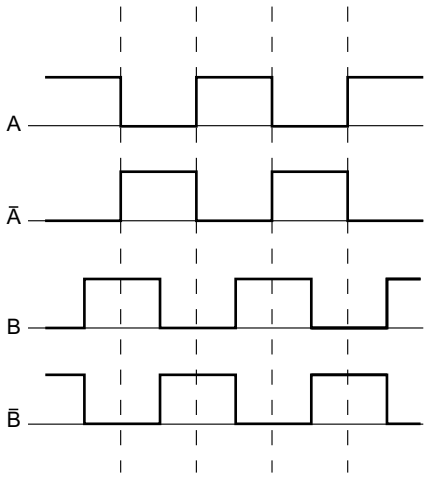
  The following sample values are obtained for encoder adjustment depending on the selected user unit.

Measuring section	User unit	Adjustment
Linear	mm/s	2500 mm
	m/s	2500 m
Rotational	Degree/s	125 degrees
	rev/s	125 rev
	rpm	125 rev

- SEW-EURODRIVE recommends not to exceed a maximum resolution ratio of 1:10000 between "encoder 1" and "encoder 2".
- If you change the encoder configuration at a later date in the user interface of the MOVISAFE® Config UCS compact software, the existing parameters for the monitoring functions might no longer be compatible with the new encoder configuration. In this case, check the parameter settings and value ranges of all the monitoring functions in use.

5.8.5 Connection of HTL proximity sensors

HTL proximity sensors are connected to the safety modules (from UCS11B) at terminal X32 (DI0.05 – DI0.08). The binary inputs are used as counting inputs. The circuit logic of the HTL proximity sensors must be debounced. When using HTL encoders, the signals are always to be read-in with standard and complementary track (A, B and $\overline{A}$, $\overline{B}$ with a phase shift of 90°).



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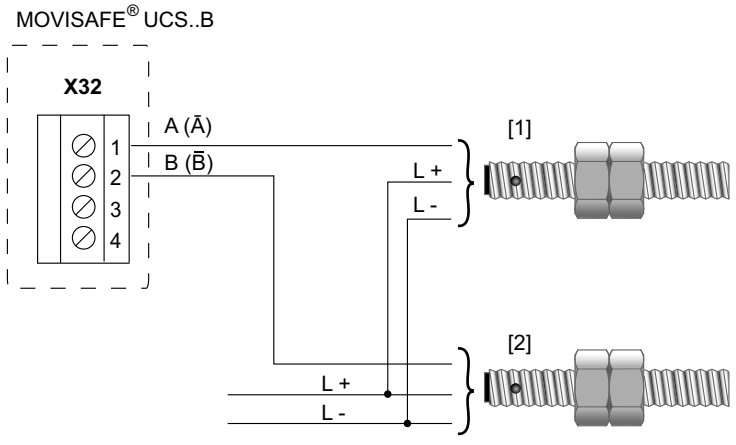
The connection assignment of HTL proximity sensors varies depending on the selected encoder combination. When selecting HTL 1Z (1 counter) only one track is read per encoder, with HTL 2Z (2 counters), two tracks are read. It is important that the assignment matches your configuration. The assignment is indicated in the user interface of the MOVISAFE® Config UCS compact software.

When using HTL proximity sensors, bear in mind that the encoder voltage supply is not monitored by the safety module. You therefore have to include the possibility of a voltage supply failure in the possible sources of error for the whole system. You have to make sure that a violation of the values specified for the encoder voltage supply will be detected as an error or can be ruled out.

Following an example of two typical connection combinations.

1. Connection of an HTL proximity sensor in the combination of 1Z/1Z



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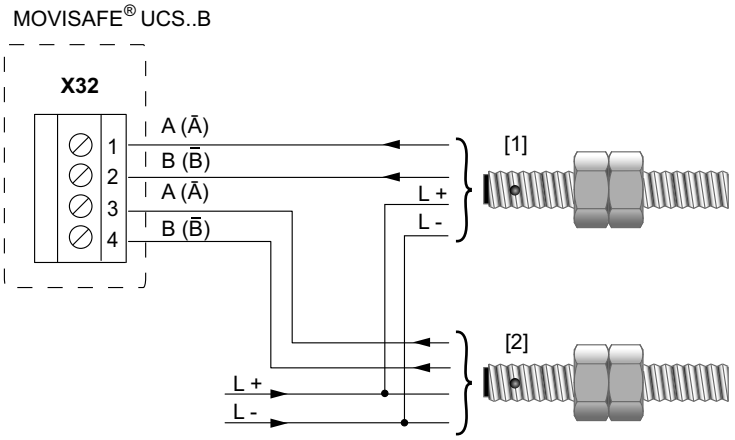
[1] HTL proximity sensor 1
[2] HTL proximity sensor 2

2. Connection of an HTL proximity sensor in the combination of 2Z/2Z



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[1] HTL proximity sensor 1
[2] HTL proximity sensor 2

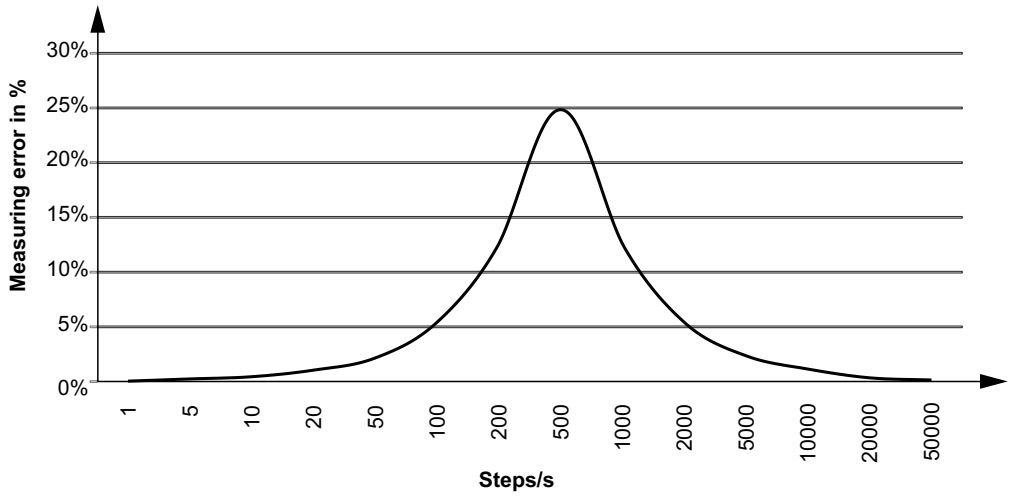
INFORMATION

Low-resolution HTL proximity sensors are not suited for resolving low speeds.

5.8.6 Measuring error during speed measurement

MOVISAFE® UCS..B measures the speed up to a frequency of 500 steps/s using the time measuring method. Frequencies higher than 500 steps/second are measured using the frequency measuring method. Both measuring methods are subject to a measuring error as shown below.

If you are operating your application in this velocity range, you must take the measuring error into account when dimensioning the switch-off limits of the safety functions. The measuring error can be reduced by selecting a suitable encoder or making suitable encoder settings in MOVISAFE® Config UCS compact.



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Example 1: Velocity monitoring

- PPR count: 256 steps/rev
- Requested switch-off limit: 120 rpm

- Steps per second for the required switch-off limit:
  256 steps/rev × 120 rev/min × 1/60 min/s = 512 steps/s
- Resulting measuring error according to the illustration: approx. 25%
- Required switch-off limit: 120 rev/min × 1.25 = 150 rev/min

Example 2: Reducing the measuring error with a higher PPR count:

- PPR count: 1024 steps/rev
- Requested switch-off limit: 120 rpm
- Steps per second for the required switch-off limit:
  1024 steps/s × 120 rpm × 1/60 min/s = 2048 steps/s
- Resulting measuring error according to the illustration: approx. 6.5%
- Required switch-off limit: 120 rpm × 1.065 ≈ 127 rpm

5.8.7 Voltage supply for encoder systems

NOTICE

The encoder system is connected to more than one voltage supply.

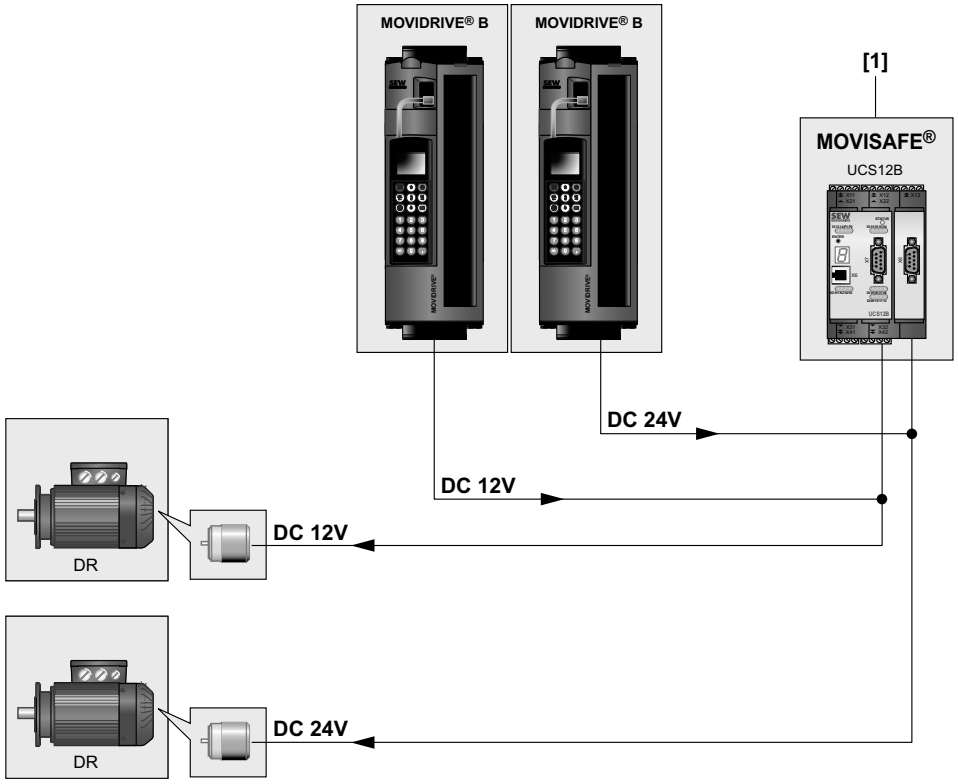
More than one voltage supply can result in a destruction of the encoder. Undetected voltage dips can lead to a failure of the safety functions.

The encoder system may only be connected to one voltage supply.

An encoder system on the basic module is required for monitoring movements and positions. Note that the basic module does not provide a voltage supply for the encoder system.

There are 2 ways to implement the voltage supply for the encoder system:

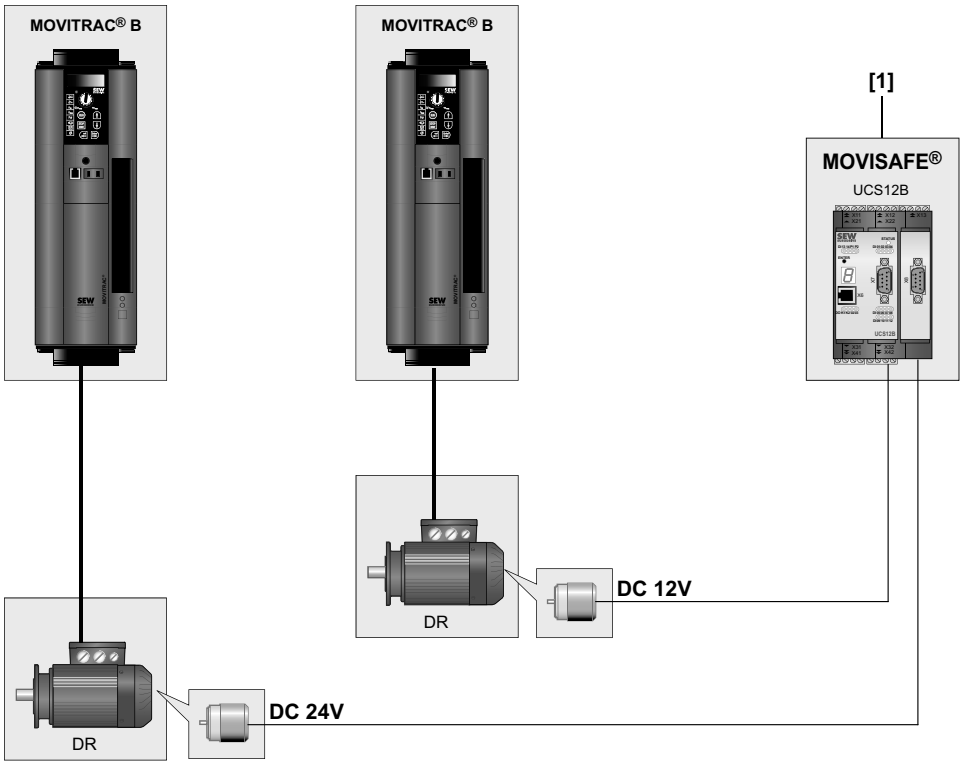
- Splitting the signal via a split cable / encoder signal split box via prefabricated cables



5165839243

If the signals are split between the basic module UCS12B [1] and the frequency inverter (e.g. MOVIDRIVE® B), the encoder voltage supply is carried out via the encoder card of the frequency inverter. The prefabricated cables route the encoder voltage supply to the UCS12B basic module for monitoring purposes. Terminals X12 and X13 of the basic module are not connected in this connection type.

- Direct connection of the encoder system to the basic module (without signal splitting)



5165842699

When connecting the encoder system directly to the UCS12B basic module [1], the encoder voltage is supplied via the basic module. In this case, connect the required encoder voltage to terminals X12 and X13 of the basic module [1]. The encoder voltage is monitored in the basic module [1] The encoder voltage supply must be fused with max. 2 A.

The encoder supply voltage is monitored internally with a tolerance range. You can adjust the internal monitoring to the encoder supply voltage via the MOVISAFE® Config UCS compact software interface. A violation of the tolerance limits results in an error and disables the outputs. The following settings are available in MOVISAFE® Config UCS compact:

Setting in MOVISAFE® Config UCS compact [V]	Minimum voltage [V]	Maximum voltage [V]
5	4.4	5.6
8	7	8.8
10	8	12
12	10	14
20	16	24
24	20	29

INFORMATION

- Ensure safe galvanic isolation of the encoder supply voltage to the AC 230 V or AC 400 V system. Select supply units that comply with VDE 0551, EN 60742 and DIN EN 0160.
- Provide for an equipotential bonding between PE and DC 0 V of the encoder supply voltage.
- The encoder voltage to be monitored can be parameterized separately for each encoder interface (X7, X8) in MOVISAFE® Config UCS compact.
- It is not possible to disable voltage monitoring.
- If the encoder voltage supply is not fed back to the safety module for monitoring purposes (e.g. HTL encoder at the digital input terminals), then you have to include the possibility of a voltage supply failure in the possible sources of error for the whole system. You have to make sure that a violation of the specified encoder supply voltage values will be detected as an error or can be ruled out.

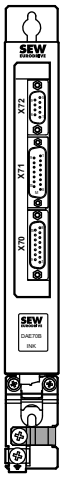
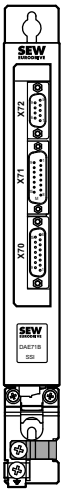
5.8.8 Connection options for an encoder system

The connection of an encoder system can be carried out as follows:

- Via prefabricated cables
- Via the DAE70B/71B encoder signal split box

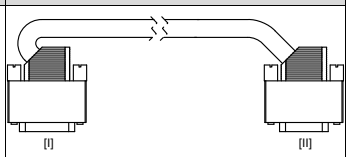
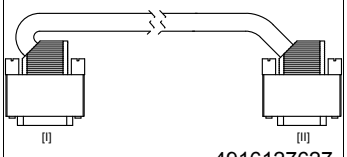
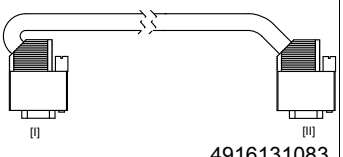
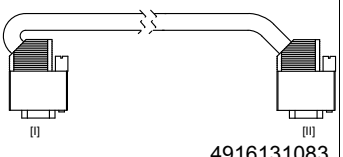
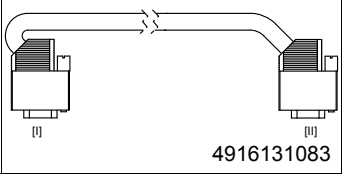
The following overview shows the connection options for an encoder system.

Encoder signal split boxes

Designation	Description	Connection	Part number	Symbol
DAE70B	Encoder signal split box for incremental encoder (INK)	• X26: TF temperature sensor • X70: Encoder connection • X71: MOVIDRIVE® B/MOVIAXIS® • X72: MOVISAFE® UCS..B/DCS..B	1824 379 7	 4916135051
DAE71B	Encoder signal split box for absolute encoders (SSI)	• X26: TF temperature sensor • X70: Encoder connection • X71: MOVIDRIVE® B/MOVIAXIS® • X72: MOVISAFE® UCS..B/DCS..B	1824 380 0	 4916138507

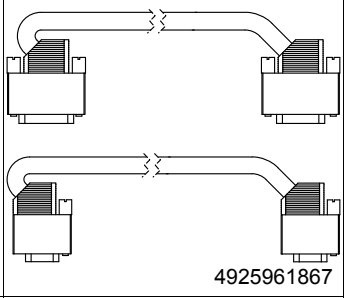
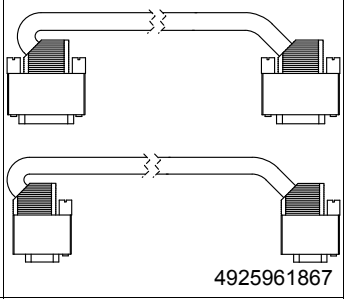
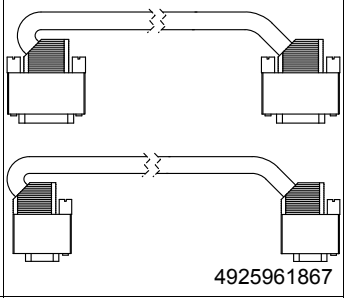
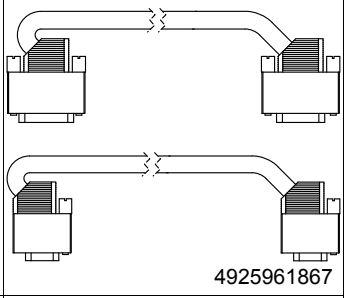
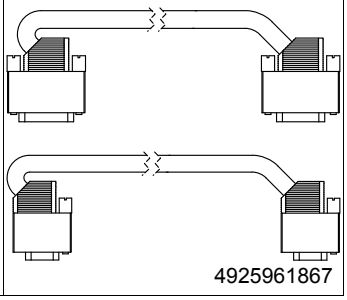
Connection cables for encoder signal split boxes

The connection cables can be configured from 0.8 m to 6 m.

Designation	Description	Connection	Part number	Symbol
DAE80B	Connection between encoder signal split box and MOVIDRIVE® B	MOVIDRIVE® B: • DEH11B:X15 • DEH21B:X15 • DEU21B:X15	1813 265 0	 4916127627
DAE81B	Connection between encoder signal split box and MOVIAXIS®	MOVIAXIS®: • MXA:X13 • XGH11A:X63 • XGS11A:X64	1813 266 9	 4916127627
DAE82B	Connection between encoder signal split box and MOVISAFE® UCS..B	MOVISAFE®: • UCS..B:X7 • UCS..B:X8	1813 112 3	 4916131083
DAE83B	Connection between encoder signal split box and MOVISAFE® DCS..B	MOVISAFE®: • DCS..B:X84 • DCS..B:X85	1813 111 5	 4916131083
DAE84B	Connection between encoder signal split box and MOVIDRIVE® B	MOVIDRIVE® B: • DEH21B:X62 • DIP11B:X62	1814 321 0	 4916131083

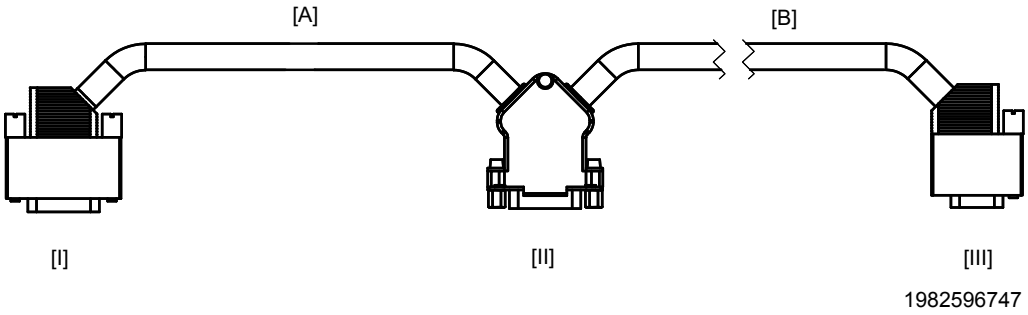
Cable sets for encoder signal split box

The connection cables for the cable sets are delivered with a fixed length of 1.5 m.

Designation	Description	Connection	Part number	Symbol
Cable set 1	Cable set encoder signal split box for MOVIDRIVE® B with DEH11B, DEH21B and DEU21B and MOVISAFE® UCS..B for splitting the SIN/COS and TTL signals; also SSI signals when using DEU21B	Includes the cables: • DAE80B • DAE82B	1824 690 7	
Cable set 2	Cable set encoder signal split box for MOVIDRIVE® B with DEH11B, DEH21B and DEU21B and MOVISAFE® DCS..B for splitting the SIN/COS and TTL signals; also SSI signals when using DEU21B	Includes the cables: • DAE80B • DAE83B	1824 691 5	
Cable set 3	Cable set encoder signal split box for MOVIAXIS® and MOVISAFE® UCS..B for splitting SIN/COS, TTL and SSI signals	Includes the cables: • DAE81B • DAE82B	1824 692 3	
Cable set 4	Cable set encoder signal split box for MOVIDRIVE® B with DIP11B and DEH21B and MOVISAFE® DCS..B for splitting SSI signals	Includes the cables: • DAE84B • DAE83B	2820 303 8	
Cable set 5	Cable set encoder signal split box for MOVIDRIVE® B with DIP11B and DEH21B and MOVISAFE® UCS..B for splitting SSI signals	Includes the cables: • DAE84B • DAE82B	2820 304 6	

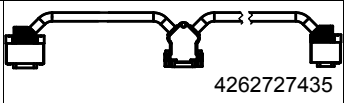
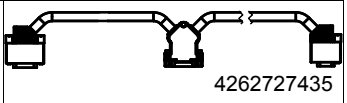
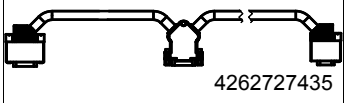
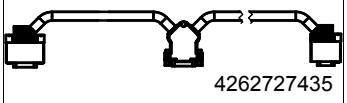
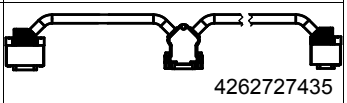
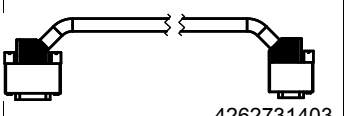
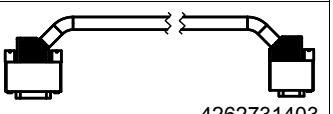
Split cables and adapter cables

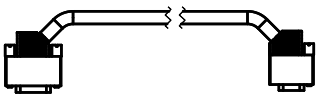
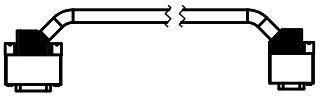
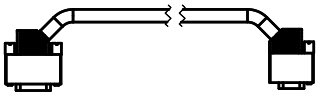
The length of the adapter cables and the B-side of the split cables can be configured from 0.5 m to 6 m.



[A] A-side with fixed length (0.8 m)
[B] B-side with variable length (0.5 m to 6 m)
[I] Encoder card connection
[II] Encoder connection
[III] MOVISAFE® UCS..B connection

Split cables for MOVISAFE® UCS..B

Designation	Description	Connection	Part number	Symbol
DAE50B	Splitting of SIN/COS and TTL encoder (asynchronous motor)	MOVIDRIVE® B: • DEH11B:X14 • DER11B:X14 • DEU21B:X14	1811 447 4	
DAE52B	Splitting of SIN/COS and TTL encoder (asynchronous motor)	MOVIDRIVE® B: • DEH11B/21B:X15 • DEU21B:X15 MOVIAXIS®: • MXA:X13 • XGH11A:X63 • XGS11A:X64	1811 449 0	
DAE53B	Splitting of SIN/COS and TTL encoder (synchronous motor)	MOVIDRIVE® B: • DEH11B/21B:X15 • DEU21B:X15 MOVIAXIS®: • MXA:X13 • XGH11A:X63 • XGS11A:X64	1811 450 4	
DAE54B	Splitting of SSI encoder	MOVIDRIVE® B: • DIP11B:X62 • DEH21B:X62	1811 451 2	
DAE55B	Splitting of SSI encoder	MOVIDRIVE® B: • DEU21B:X15	1811 452 0	
DAE56B	Encoder simulation adapter	MOVIAXIS®: • XGH11A:X62 • XGS11A:X62	1811 464 4	
DAE57B	Adapter SIN/COS, TTL encoder, encoder simulation	MOVIDRIVE® B: • DEH11B:X14 • DER11B:X14 • DEU21B:X14	1811 465 2	

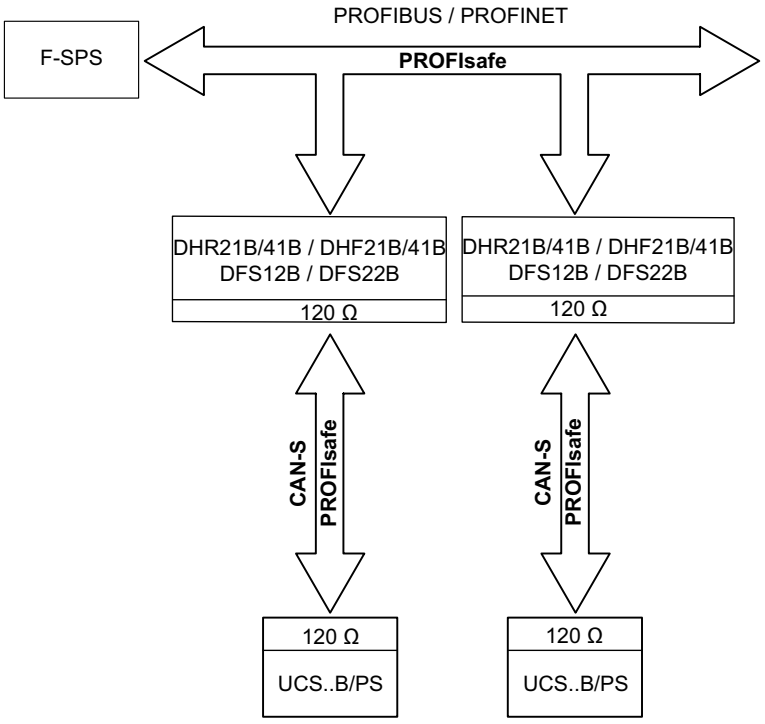
Designation	Description	Connection	Part number	Symbol
DAE58B	SSI encoder adapter	Cable (D-sub 9 to D-sub 9) with resistors	1811 919 0	 4262731403
DAE59B	SSI encoder adapter	Cable (D-sub 15 to D-Sub 9) with resistors Encoder voltage DC 24 V on pin 13	1811 920 4	 4262731403
DAE60B	SSI encoder adapter	Cable (D-sub 15 to D-Sub 9) with resistors DC 12 V encoder voltage on pin 15	1812 043 1	 4262731403
DAE61B	Splitting of SSI encoder	MOVIDRIVE® B: • DEU21B:X14 MOVIAXIS®: • XGS11A:X64	1812 042 3	 4262727435

5.9 Fieldbus connection via UCS..B/PS option to PROFIsafe

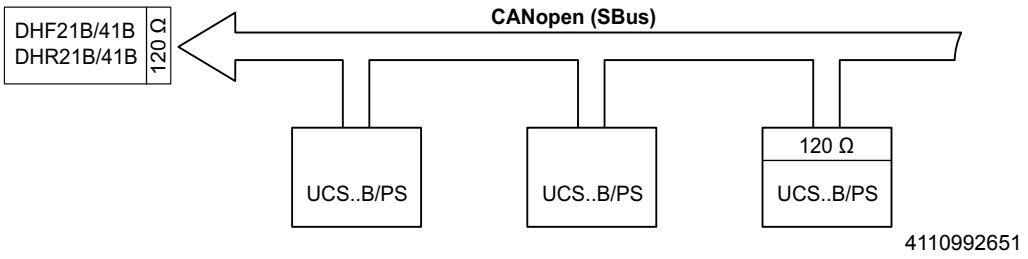
5.9.1 Connecting the UCS..B/PS option

The UCS..B/PS option allows for connecting a fieldbus to a higher-level controller. Two CAN communication interfaces are available for connection to PROFIsafe and for exchanging diagnostic data. Both CAN interfaces are designed as a slave and need a CAN master for operation. You can configure the process image for PROFIsafe and for the exchange of diagnostic data in the MOVISAFE® Config UCS compact software.

Example of a fieldbus connection to PROFIsafe:



Example of a fieldbus connection to CAN (SBus)



INFORMATION

Observe the following notes:

- The fieldbus connection must be terminated with 120 Ω at the first and last station. The UCS..B/PS option already comes equipped with an integrated 120 Ω resistor. To enable termination, connect a wire jumper from terminal XCS:4 to terminal XCS:1 (PROFIsafe) or from terminal XCD:4 to terminal XCD:1 (CAN). To terminate the controller (e.g. DHx41B), you have to wire a 120 Ω resistor.
- Use a 2×2-core twisted pair and shielded copper cable (data transmission cable with braided copper shield). Connect the shield to the ground potential (PE) and make sure it is connected over a wide area at both ends. The cable must meet the following specifications:
  – Core cross section: 0.25 mm^2 (AWG18) – 0.75 mm^2 (AWG23)
  – Cable resistance: 120 Ω at 1 MHz
  – Capacitance per unit length: ≤ 40 pF/m at 1 kHz

  Suitable cables are CAN bus or DeviceNet cables
- The permitted total cable length depends on the set baud rate:
  – 250 kBaud: 160 m
  – 500 kBaud: 80 m
  – 1000 kBaud: 40 m
- There must not be any potential displacement between the units connected via fieldbus. Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.
- Point-to-point wiring is not permitted.

5.9.2 Communication interfaces XCS and XCD

XCS terminal

- **CAN-S description**

  Interface for safe communication via PROFIsafe. The safety bus (CAN-S) is implemented for MOVISAFE® via gateway based on PROFIBUS or PROFINET.

- **Suitable gateways (CAN master)**

  MOVI-PLC®:

  – DHF21B/41B (PROFIsafe via PROFIBUS)

  – DHR21B/41B (PROFIsafe via PROFINET)

  Safe fieldbus interface:

  – DFS12B (PROFIsafe via PROFIBUS)

  – DFS22B (PROFIsafe via PROFINET)

- **Maximum number of modules per gateway**

  A maximum of one module can be used per gateway.

- **CAN-S address**

  15 (fixed setting).

- **PROFIsafe address (F destination)**

  1 to 65534.

- **Data transmission**

PROFIBUS PROFIsafe		
Gateway	**PROFIsafe data width**	
DHF41B (MOVI-PLC/CCU)	12 bytes	Bi-directional
DHF21B (MOVI-PLC/CCU)	12 bytes	
DFS12B	8 bytes	
PROFINET PROFIsafe		
Gateway	**PROFIsafe data width**	
DHR41B (MOVI-PLC/CCU)	12 bytes	Bi-directional
DHR21B (MOVI-PLC/CCU)	12 bytes	
DFS22B	8 bytes	

- **F-bus configuration**

  Can be configured via MOVISAFE® Config UCS compact

- **Options**
  - Program download
  - Safety data set (SDS) activation
  - Safe exchange of logic and process data to the higher-level controller
  - Diagnostic functions of MOVISAFE® Config UCS compact (such as scope)
  - Data backup in the event of unit replacement
- **Baud rate**

  500 kBit/s

XCD terminal

- **CAN-D description**

  Interface for non-safe communication with a higher-level controller via CAN (SBus). Allows to transmit diagnostic data and is not permitted for safety-relevant use.

- **Suitable gateways (CAN master)**

  MOVI-PLC®:
  - DHF21B/41B (SBus on PROFIBUS)
  - DHR21B/41B (SBus on PROFINET)
- **SBus address**

  Is set using DIP switches 1 to 63.

- **Data transmission**

PROFIBUS		
Gateway	**Data width of diagnostic data**	
DHF41B (MOVI-PLC)	20 bytes	UCS..B → MOVI-PLC
DHF21B (MOVI-PLC)	20 bytes	
PROFINET		
Gateway	**Data width of diagnostic data**	
DHR41B (MOVI-PLC)	20 bytes	UCS..B → MOVI-PLC
DHR21B (MOVI-PLC)	20 bytes	

- **F-bus configuration**

  Can be configured via MOVISAFE® Config UCS compact

- **Options**
  - Program download
  - Data set activation
  - Transmission of 16 bytes of diagnostic data (7 bytes of logic data and 8 bytes of process data). See chapter "Structure of the CAN telegram (SBus)".
  - Diagnostic functions of MOVISAFE® Config UCS compact (such as scope)
  - Data backup in the event of unit replacement
- **Baud rate**

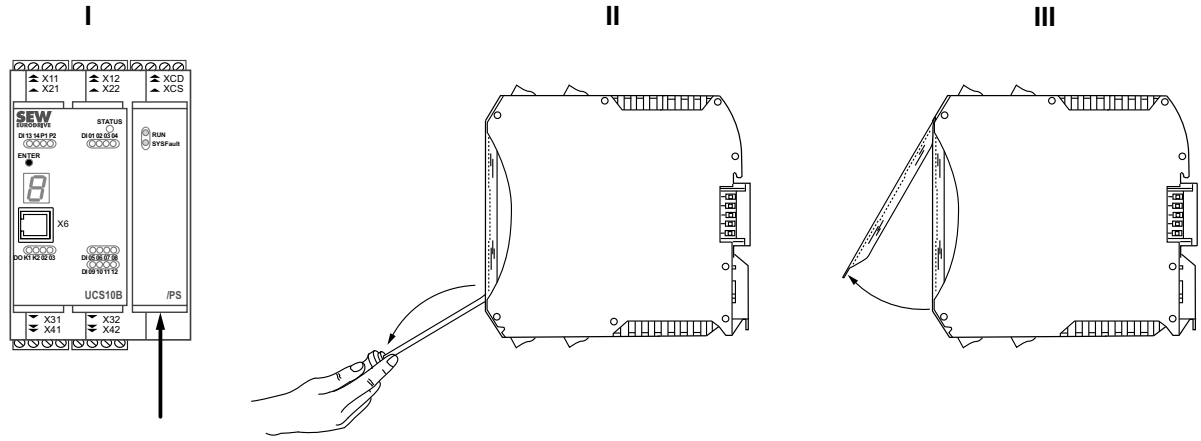
  Can be set to 125 kBit/s, 250 kBit/s, 500 kBit/s or 1 MBit/s in MOVITOOLS® MotionStudio.

5.9.3 Address switch for standard communication

The address for standard communication is set using DIP switches on the MOVISAFE® UCS..B/PS safety modules. The DIP switches are located behind the front cover of the UCS..B/PS option.

Proceed as follows to open the front cover:

1. The front cover of the UCS..B/PS option can be opened via a recess [figure I].
2. Insert a suitable screwdriver into the recess and press the screwdriver slightly downwards (figure II).
3. The front cover unlocks and can now be moved upwards (figure III)



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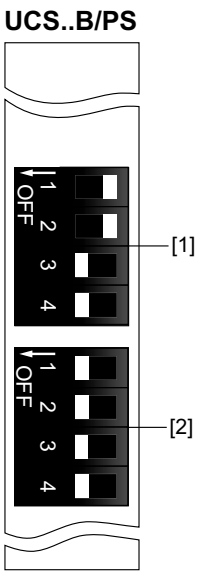
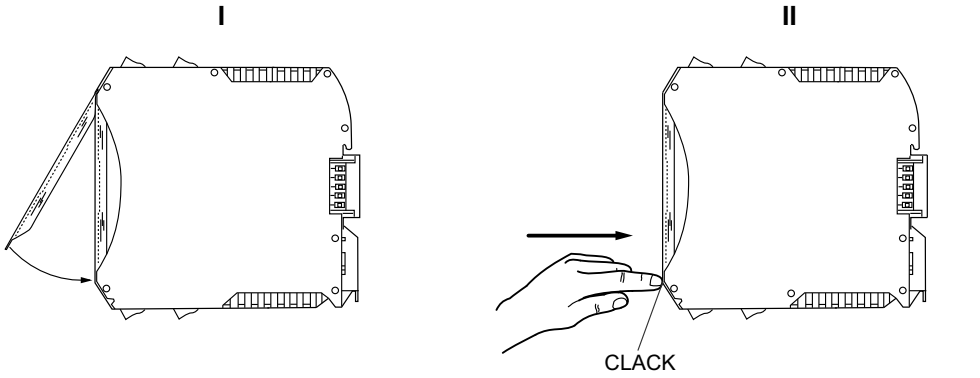
4. The DIP switches for setting the address are located behind the opened front cover. You can set addresses 1 to 63. Following an example of address setting 3 (DIP switches 2^0 and 2^1 = ON).

UCS..B/PS option	DIP switch	Description
	S1	2^0 → Significance 1×1 = 1
	S2	2^1 → Significance 2×1 = 2
	S3	2^2 → Significance 4×0= 0
	S4	2^3 → Significance 8×0 = 0
	S5	2^4 → Significance 16×0 = 0
	S6	2^5 → Significance 32×0 = 0
	S7	N.C.
	S8	N.C.

[1] DIP switches S1 – S4
[2] DIP switches S5 – S8

5. Once you have set the address for standard communication, close the front cover again. To do so, tilt down the front cover (figure I). Use your finger to press the front cover until it audibly snaps in place (figure II).



5.9.4 Configuring the PROFIsafe input profile (PAE)

The PROFIsafe input profile is available for the PROFIsafe inputs of the F-PLC. The UCS..B/PS option lets you transmit logic and process data, such as the status of a safety function, the current speed or current position, to a higher-level safety controller for further processing.

In the user interface of the MOVISAFE® Config UCS compact software, you define the number of bits required for logic or process data. The selection is limited by the bandwidth available depending on the selected gateway (for DFS12B/22B: 8 bytes = 64 bits, for DHR/DHF21B/41B: 12 bytes = 96 bits). The UCS..B/PS option monitors the bandwith and prevents it from being exceeded. For detailed project planning information, refer to the online help of the MOVISAFE® Config UCS compact software.

The following information can be chosen as process data in the MOVISAFE® Config UCS compact software:

Process data	Source	Data width	
Current position	Axis 1 or 2	16, 24 bits	Configurable data length
Current velocity		0 = 16 bits	
Current SLP position (teach-in)		16, 24 bits	
Error and operating messages		16 bits	Data length cannot be configured

5.9.5 Configuring the PROFIsafe output profile (PAA)

The PROFIsafe output profile is available for the PROFIsafe outputs of the F-PLC. Like the PROFIsafe input profile, the PROFIsafe output profile lets you transmit logic and process data, such as activating a safety function or specifying a position, to the UCS..B/PS safety module via a higher-level safety controller.

In the user interface of the MOVISAFE® Config UCS compact software, you define the number of bits required for logic or process data. The selection is limited by the bandwidth available depending on the selected gateway (for DFS12B/22B: 8 bytes = 64 bits, for DHR/DHF21B/41B: 12 bytes = 96 bits). The UCS..B/PS option monitors the bandwith and prevents it from being exceeded. For detailed programming information, refer to the online help of the MOVISAFE® Config UCS compact software.

The following information can be chosen as process data in the MOVISAFE® Config UCS compact software:

Process data	Source	Data length	
Current position	Axis 1 or 2	16, 24	Configurable data length
Current velocity[1)]		8, 16	

1) Process data with reference to the current velocity under preparation

5.9.6 Structure of a CAN telegram (SBus)

Diagnostics	Process data word	Bit	High byte assignment	Low byte assignment
PS-module diagnostics	0	0 – 15	MOVILINK® status word	
UCS..B diagnostics	1	0 – 3		Status
		4		1
		5 – 7		Life bit
		8 – 15	0	
	2	0 – 15	Diagnostic data (bits 8 – 15)	Diagnostic data (bits 0 – 7)
			High byte error code[1)]	Low byte error code[1)]
	3 (RUN status)	15	"0"	
		0 – 14	Diagnostic data (bits 24 – 30)	Diagnostic data (bits 16 – 23)
		15	"1"	
		0 – 14	High byte error code	Low byte error code
	4	0 – 15	Diagnostic data (bit: 40 – 47)	Diagnostic data (bit: 32 – 39)
	5	0 – 15	Diagnostic data (bit: 56 – 63)	Diagnostic data (bit: 48 – 55)
	6	0 – 15	Process data (bit: 8 – 15)	Process data (bit: 0 – 7)
	7	0 – 15	Process data (bit: 24 – 31)	Process data (bit: 16 – 23)
	8	0 – 15	Process data (bit: 40 – 47)	Process data (bit: 32 – 39)
	9	0 – 15	Process data (bit: 56 – 63)	Process data (bit: 48 – 55)

1) In case of "alarm" and "error" status

- In "alarm" or "error" status, the error code is transmitted on process data word 3 to ensure that also the error code is transmitted when gateways with 6 bytes of diagnostic data are used.
- Process data word 2 (bits 0 – 3) always contains the current status of the basic modules. This status is also indicated on the 7-segment display. The bit position of the logic data in the CAN telegram can be configured as required.

5.10 Diagnostic module UCS25B with CAN interface

The UCS25B diagnostic module can be used for non-safe communication via CAN (SBus) with a higher-level controller. In MOVISAFE® Config UCS compact, you can set the transmission of 2 CAN telegrams with 8 bytes each. The first CAN telegram is always sent and contains variable logic data from the logic diagram. The second CAN telegram contains configurable process data and can be sent optionally. The CAN ID assigned to the data frame can be configured as required.

A data frame is structured as follows:

Byte 7	Byte 6	Byte 5	Byte 4	Byte 3	Byte 2	Byte 1	Byte 0

The baud rate of the CAN interface is 500 kbit/s.

5.10.1 Structure of CAN telegram 1

Byte	Bit	Description	
0	0 – 3	1 = STARTUP 2 = SEND CONFIG 3 = STARTUP BUS 4 = RUN 5 = STOP 6 = FAILURE 7 = ALARM	
	4	0x1 (fixed value)	
	5 – 7	Life bit	
1	0 – 7	Logic data (data bit: 48 – 55)	
2	0 – 7	Logic data (data bit: 40 – 47)	
3	0 – 7	Logic data (data bit: 32 – 39)	
4	0 – 7	Logic data (data bit: 8 – 15)	
5	0 – 7	Logic data (data bit: 0 – 7)	
6	0 – 6	Logic data (data bit: 24 – 30)	High byte error code
	7	"0" (status bit)	"1" (status bit)
7		Logic data (data bit: 16 – 23)	Low byte error code

Byte 0 (bits 0 – 3) of the logic data always contains the current status of the basic modules. This status is also indicated on the 7-segment display. The bit position of the logic data in CAN telegram 1 can be configured as required.

INFORMATION

If the unit is in alarm or error status, the associated alarm or error message is displayed in bytes 6 and 7 (data bits 16 – 30). The status bit (byte 6, bit 7) changes to "1". This means that any configured logic data information is overwritten.

After having acknowledged the alarm or error status, the error code in bytes 6 and 7 is replaced with the current logic data again.

5.10.2 Structure of CAN telegram 2

The bit position of the process data in CAN telegram 2 is assigned automatically depending on the configured data and the data length. The bit position is displayed when configuring the process data in MOVISAFE® Config UCS compact.

The refresh rate of the CAN telegram is distinguished as follows:

- Cyclic transmission

  With a factor X as a multiple of the cycle time of the basic module, the refresh rate can be set as required. Factor X can have the values "1" to "255".

  Example:

  - UCS..B cycle time: 8 ms
  - Factor X: 10

  Refresh rate: 10 × 8 ms = 80 ms

- Acyclic transmission

  Process data are refreshed automatically when the data content in the overall telegram is changed, else every 500 ms.

Byte	Bit	Description
0	0 – 7	Process data (data bit: 56 – 63)
1	0 – 7	Process data (data bit: 48 – 55)
2	0 – 7	Process data (data bit: 40 – 47)
3	0 – 7	Process data (data bit: 32 – 39)
4	0 – 7	Process data (data bit: 24 – 31)
5	0 – 7	Process data (data bit: 16 – 23)
6	0 – 7	Process data (data bit: 8 – 15)
7	1 – 7	Process data (data bit: 0 – 7)

The following information can be chosen as process data in the MOVISAFE® Config UCS compact software:

Process data	Source	Data length in bits	Comment
Current position	Axis 1 or 2	16, 20, 24	Configurable data length
Current velocity		08, 12, 16	
Current SLP position (teach-in)		16, 20, 24	
Error and operating messages		16	Data length cannot be configured

INFORMATION

- For configuration, bear in mind that 64 bits is the maximum number of bits of CAN telegram 2 that can be transmitted.
- Non-existent process data (for example because no encoder has been configured) are sent with "0". The availability of process data is not monitored.
- If a process value is greater than the corresponding configured data length, an overflow occurs. In this case, the transmitted process value is useless in the higher-level controller. Bear in mind for project planning that monitoring for a possible overflow is not implemented. SEW-EURODRIVE recommends the following procedure.

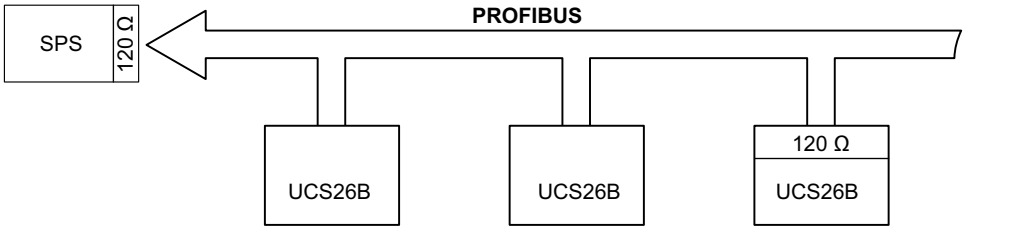
  Example 1: Current position
  – Current position: 400.97 mm (read from MOVISAFE® Config UCS compact, scope)
  – Selected data length: 16 bits
  – *FactorPos*: 1000 (read from MOVISAFE® Config UCS compact, "Sensors" field)
  Determine the required data length:
  – Calculate the value:
  Current position × *FactorPos* = 400.97 mm × 1000 = 400970
  – Check the selected data length:
  400970 > 2^{16} (16 bits)
  – Required data length:
  400970 < 2^{20} (20 bits)
  The data length should be configured to the greatest value to be transmitted (maximum position). You can choose from a data length of 16, 20 or 24 bits.

  Example 2: Current velocity
  – Current velocity: 400.97 mm/s (read from MOVISAFE® Config UCS compact, scope)
  – Selected data length: 8 bits
  – *FactorSpeed*: 10 (read from MOVISAFE® Config UCS compact, "Sensors" field)
  Determine the required data length:
  – Calculate the value:
  Current velocity × *FactorSpeed* = 400.97 mm/s × 10 = 4009.7
  – Check the selected data length:
  4009.7 > 2^{8} (8 bits)
  – Required data length:
  400970 < 2^{12} (12 bits)
  The data length should be configured to the greatest value to be transmitted (maximum velocity). You can choose from a data length of 8, 12 or 16 bits.

5.11 Diagnostic module UCS26B with PROFIBUS interface

The UCS26B diagnostic module can be used for standard communication. It allows for transmitting a maximum of 16 bytes (logic data + process data) from the CAN backplane bus of the UCS..B modules to a higher-level controller via PROFIBUS. The module is to be parameterized as PROFIBUS station (slave). The corresponding GSD files are available for download from the SEW homepage (www.sew-eurodrive.com). The UCS26B has to be connected with a basic module (UCS10B, UCS11B or UCS12B) via backplane bus connector.

Example of a PROFIBUS fieldbus connection:



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INFORMATION

- The fieldbus connection must be terminated with 120 Ω at the first and last station. The UCS26B diagnostic module already comes equipped with an integrated 120 Ω resistor. To enable termination, set DIP switch S2 on the UCS26B diagnostic module to ON.
- To enable termination on the backplane bus, set DIP switch S1 on the UCS26B diagnostic module to ON.
- The data transmission cable and the PROFIBUS plug connection have to be designed according to the assembly specifications of the PNO (PROFIBUS user organization).
- There must not be any potential displacement between the units connected via fieldbus. Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.
- Voltage is supplied via the basic module.

5.11.1 XDP communication interface

- Description

  Interface for standard communication via PROFIBUS.

- Setting the PROFIBUS address

  The PROFIBUS address of the UCS26B diagnostic module can be set as required using address switches S3 and S4. Set the address in hexadecimal format.

  Example 1: PROFIBUS address 5

Address switch	Function	Setting (hex)
S3	High byte	0
S4	Low byte	5

  Example 2: PROFIBUS address 46

Address switch	Function	Setting (hex)
S3	High byte	2
S4	Low byte	E

- Data transmission

  Transmission of a maximum of 16 bytes of diagnostic data (logic data + process data).

- Baud rate

  9.6 kBaud to 12 MBaud. The baud rate is detected automatically.

- Cycle time: 20 ms

- Structure of logic data

Byte	Bit	Description	
0	0 – 3	1 = STARTUP 2 = SEND CONFIG 3 = STARTUP BUS 4 = RUN 5 = STOP 6 = FAILURE 7 = ALARM	
	4	0x1 (fixed value)	
	5 – 7	Life bit	
1	0 – 7	Logic data (data bit: 48 – 55)	
2	0 – 7	Logic data (data bit: 40 – 47)	
3	0 – 7	Logic data (data bit: 32 – 39)	
4	0 – 7	Logic data (data bit: 8 – 15)	
5	0 – 7	Logic data (data bit: 0 – 7)	
6	0 – 6	Logic data (data bit: 24 – 30)	Error code high byte
	7	"0" (status bit)	"1" (status bit)
7		Logic data (data bit: 16 – 23)	Error code low byte

Byte 0 (bits 0 – 3) of the logic data always contains the current status of the basic modules. This status is also indicated on the 7-segment display. The bit position of the logic data can be configured as required.

INFORMATION

If the unit is in alarm or error status, the associated alarm or error message is displayed in bytes 6 and 7 (data bits 16 – 30). The status bit (byte 6, bit 7) changes to "1". This means that any configured logic data information is overwritten.

After having acknowledged the alarm or error status, the error code in bytes 6 and 7 is replaced with the current logic data again.

- Structure of process data

Byte	Bit	Description
0	0 – 7	Process data (data bit: 56 – 63)
1	0 – 7	Process data (data bit: 48 – 55)
2	0 – 7	Process data (data bit: 40 – 47)
3	0 – 7	Process data (data bit: 32 – 39)
4	0 – 7	Process data (data bit: 24 – 31)
5	0 – 7	Process data (data bit: 16 – 23)
6	0 – 7	Process data (data bit: 8 – 15)
7	0 – 7	Process data (data bit: 0 – 7)

The following information can be chosen as process data in the MOVISAFE® Config UCS compact software:

Process data	Source	Data length in bits	Comment
Current position	Axis 1 or 2	16, 20, 24	Configurable data length
Current velocity		08, 12, 16	
Current SLP position (teach-in)		16, 20, 24	
Error and operating messages		16	Data length cannot be configured

5.12 Diagnostic module UCS27B with PROFINET interface

The UCS27B diagnostic module can be used for standard communication. It allows for transmitting a maximum of 16 bytes (logic data + process data) from the CAN backplane bus of the UCS..B modules to a higher-level controller via PROFINET. The module is to be parameterized as PROFINET station (slave). The corresponding GSDML files are available for download from the SEW homepage (www.sew-eurodrive.com). The UCS27B diagnostic module has to be connected with a basic module (UCS10B, UCS11B er UCS12B) via backplane bus connector.

INFORMATION

- To enable termination on the backplane bus, set DIP switch S1 on the UCS27B diagnostic module to ON.
- The data transmission cable and the PROFINET plug connection have to be designed according to the assembly specifications of the PNO (PROFIBUS user organization).
- There must not be any potential displacement between the units connected via fieldbus. Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.
- Voltage is supplied via the basic module.

5.12.1 XPN communication interface

- Description

  Interface for standard communication via PROFINET.

- PROFINET IP address

  IP address and device name are configured by the higher-level controller.

- Data transmission

  Transmission of a maximum of 16 bytes of diagnostic data (logic data + process data).

- Ethernet data rate

  100 Mbit/s in full duplex mode.

- 100 m maximum line length.

6 Startup

6.1 General startup instructions

6.1.1 Prerequisites

- The following prerequisites must be fulfilled to ensure successful startup:
  - The system must be configured correctly
  - The MOVISAFE® Config UCS compact software must be installed. The latest release is available on the Internet on the SEW homepage or on the MOVISAFE® software ROM.

  For detailed project planning notes and a description of the parameters, refer to the online help of the MOVISAFE® Config UCS compact software.
- Installation requirements for installing and operating the MOVISAFE® Config UCS compact software:
  - Operating system: Microsoft Windows® 2000, XP, Vista or 7 (32 or 64 bits)
  - Required hard disk space: about 100 MB
  - RAM: 512 MB or more recommended
- Additional requirements for using the UCS..B/PS option with PROFIsafe fieldbus connection via PROFIBUS or PROFINET:
  - MOVITOOLS® MotionStudio version 5.80 or later
  - MOVISAFE® Config UCS compact compilation date 1 July 2012 or later
  - DHR21B/41B and DHF21B/41B controllers with fieldbus connection: firmware version 16 or later
  - GSD file (PROFIBUS) or GSDML file (PROFINET):

    Download from www.sew-eurodrive.com

INFORMATION

With the software MOVISAFE® Config UCS compact, you can enable or disable fieldbus communication (UCS..B/PS option). The additional requirements are not necessary when fieldbus communication is disabled.

6.1.2 Startup steps

- Make sure that the following tasks have been performed properly and in accordance with the application:
  - MOVISAFE® UCS..B installation
  - Cabling
  - Terminal assignment
  - Safe disconnection
- Provide for suitable measures to prevent the motor from starting up unintentionally. Take additional safety measures depending on the application to prevent possible injuries and damage to machines.
- Switch on the mains voltage and, if necessary, the DC 24 V supply voltage.
- Configure and program MOVISAFE® UCS..B to suit your application.
- Perform a validation (see chapter "Validation"). Create a validation report (see chapter "Validation report").

6.2 Communication and establishing a connection

6.2.1 RS485 interface X6

The RS485 interface X6 of MOVISAFE® UCS..B is implemented as RJ10 socket. It allows parameterization and diagnostics of the basic modules using the Windows® based software interface MOVISAFE® Config UCS compact.

The PC can be connected with the parameterization and diagnostic interface X6 of MOVISAFE® UCS..B using, for example, the interface adapter UWS21B (RS232 to RS485) or USB11A (USB to RS485).

In RUN mode, the logic is processed in MOVISAFE® UCS..B. Parameterization/ programming is only possible in STOP mode. You can set MOVISAFE® back to RUN mode once you have sent the configuration and the message "Configuration successfully written to flash" has appeared.

6.2.2 PROFIsafe fieldbus interface

Communication via MOVITOOLS® MotionStudio software is possible when the PROFIsafe fieldbus interface is available.

MOVITOOLS® MotionStudio is used

- to display device and diagnostic data of the UCS..B/PS option in the parameter tree,
- for parameter access to unit and diagnostics data,
- to open the MOVISAFE® Config UCS compact software. The connection is set automatically in MOVISAFE® Config UCS compact.
- for data management (read and send a configuration file),
- to send a configuration to the UCS..B/PS option,
- to enable safety date sets (SDS) for transmitting a configuration,
- to update the firmware of the UCS..B/PS option via version management.

7 Validation

To make sure that the implemented safety functions function correctly, the user must check and document the parameters and connections after startup and configuration. This is supported in the MOVISAFE® Config UCS compact software in the form of a validation report.

The MOVISAFE® concept is based on the following assumptions:

Parameter and PLC data stored in the flash memory of MOVISAFE® UCS.B cannot change automatically. Online tests and corresponding signatures ensure this by implementing basic measures on the subassembly. However, the configuration cannot be evaluated by the subassembly. This affects the parameters of the sensors, thresholds and limit values.

Validation is performed via plan management in MOVISAFE® Config UCS compact. Here you can lock the configuration and compile the validation report.

7.1 Procedure

After successful startup, the user must confirm that the data of the validation report matches the parameters of the module. The user must validate and protocol the parameterized values for the measuring section, sensors and monitoring functions individually by performing a function test. In MOVISAFE® Config UCS compact, you also have to proof and protocol the programmed PLC functions in the form of a code inspection for each link.

SEW-EURODRIVE recommends to design the controller in such a way that the limit values of MOVISAFE® UCS..B can be tested.

7.2 Validation report

7.2.1 Structure of the validation report

The file contains the following information:

- Editable header data
- Encoder configuration
- Parameters of the monitoring functions
- The IL code of the programmed PLC functions

7.2.2 Creating the validation report

You can use the MOVISAFE® Config UCS compact software interface to generate an individual validation report and save it in excel format. You can then edit and print the excel file.

7.2.3 Entries in the validation report

You can enter general information about the application (header data) in the validation report. You can use the first page of the validation report to enter general information on the system (system designation, customer, supplier, setup operator, etc.). On the second page of the validation report, you can enter more detailed information on the system/machine. This data is only for information but the content and scope should be coordinated with the approval authorities/inspector. The third page of the validation report contains the itemization for the safety check.

The MOVISAFE® Config UCS compact software automatically enters the following information in the excel file:

- Manufacturer: SEW-EURODRIVE GmbH & Co KG
- Type: MOVISAFE® UCS..B
- Parameterized values of the safety functions

All the other entries must be entered manually by the inspector:

- Date: of the day when the configuration data set was created
- CRC signature: of the verified data set
- Read-off serial number identical to the serial number on the nameplate

  The inspector responsible confirms that the read-off serial number in MOVISAFE® Config UCS compact is identical with the serial number on the nameplate attached to MOVISAFE® UCS..B.
- Identical with option:

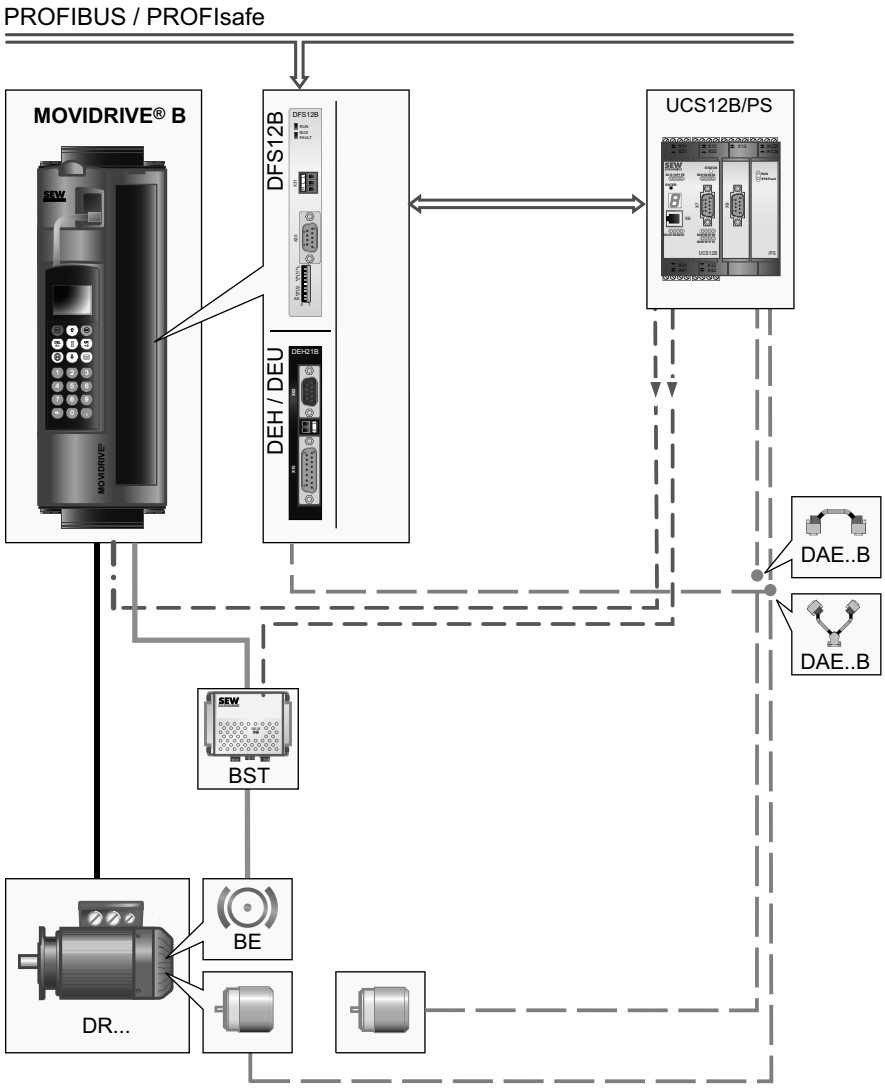
  Here, the responsible inspector confirms that the CRC displayed in MOVISAFE® Config UCS compact is identical to the one stored in MOVISAFE® UCS..B. This CRC signature consists of a five-digit number that is displayed in the connection dialog of the software interface when a connection has been established with MOVISAFE® UCS..B.
- Signature of the inspector
- Approval of the function

INFORMATION

- The correct program data and parameter data must be loaded to create the validation report.
- All listed parameters and program instructions must be validated at the system/ machine and confirmed in the validation report in writing.
- The inspector must validate all the configured data in the printed validation report. To do so, the inspector must verify all the set limit values of the monitoring functions used by performing a function test.
- The printed out IL code must be validated, see chapter "Appendix", subchapter "IL instruction list".

7.3 Determining/checking the response times for validation

The total response time of the drive system has to be determined to assess the slowing-down path of the machine. For this purpose, all the response times of the affected components (electronic and mechanical) must be determined. The following example illustrates this.



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The following components are used:

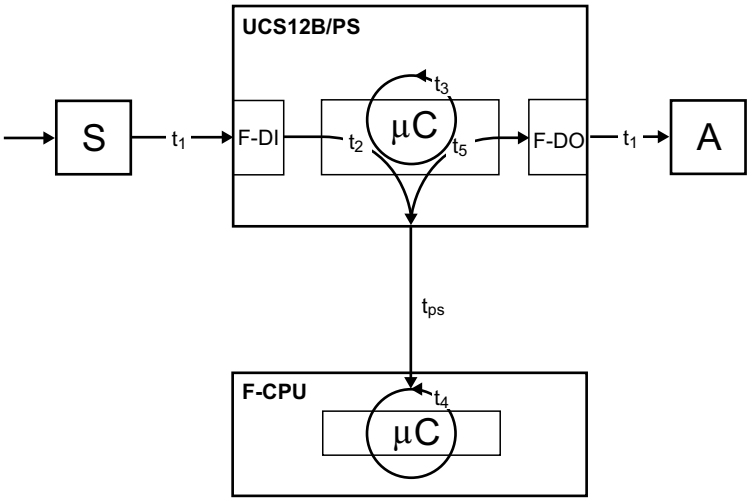
- MOVIDRIVE® B, size 1, with the following option card:
  - DFS12B as communication interface with PROFIBUS and PROFIsafe
  - DEH21B as encoder interface
- Safety-related BST brake module
- DR motor with integrated brake (BE20) and SIN/COS encoder
- Additional external SIN/COS encoder
- UCS12B/PS safety module

7.3.1 Example with SLS safety function via PROFIsafe

The drive is to be monitored for safe speed (SLS safety function). If the velocity is exceeded, the drive is switched off immediately (STO safety function).

A sensor provides a signal for activating the SLS safety function (t_1). This signal is read locally in the UCS12B/PS safety module and is reported to the safety controller (F-PLC) via PROFIsafe ($t_2 + t_{ps}$). Next, the safety controller activates the SLS safety function in the UCS12B/PS safety module via PROFIsafe (t_{R2}).

The UCS12B/PS safety module reports the status of the SLS safety function to the safety controller via PROFIsafe. When the SLS safety function trips, a message is issued to the safety controller via PROFIsafe (t_{R3}). The safety controller then disables the relevant outputs of the UCS12B/PS safety module via PROFIsafe (STO, t_{R4}). The following figure shows the chain of responses for determining the overall response time from the safety sensor to the actuator.



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UCS12B/PS	Safety module
S	Safety sensor
F-DI	Safe input UCS12B/PS
F-DO	Safe output UCS12B/PS
A	Actuator
F CPU	Safety controller
µC	Micro-controller

Response time from safety sensor to receipt in safety controller		
t_1	Response time of the safety sensor	According to manufacturer's specifications
t_2	Internal response time of the safe input (NC contact)	16 ms
t_{ps}	PROFIsafe cycle time	According to the specifications of the safety controller
t_{R1}	**Informationen pending in the F-CPU for further processing**	**Total**

Response time until the SLS safety function is activated in the UCS12B/PS		
t_4	F-PLC cycle time (worst case = 2 cycles)	Determine from safety controller
t_{ps}	PROFIsafe cycle time	According to the specifications of the safety controller
t_3	Activation of a safety function	24 ms
t_{R2}	**SLS monitoring is activated**	**Total**

Response time of SLS from the time when it is triggered until receipt in the safety controller		
t_3	Response of SLS and status in PROFIsafe process image	112 ms
t_{ps}	PROFIsafe cycle time	According to the specifications of the safety controller
t_{R3}	**Informationen pending in the F-CPU for further processing**	**Total**

Response time from safety controller to actuator		
t_4	F-PLC cycle time (worst case = 2 cycles)	Determine from safety controller
t_{ps}	PROFIsafe cycle time	According to the specifications of the safety controller
t_5	Internal response time of the safe output	16 ms
t_6	Switching time of the actuator	According to manufacturer's specifications
t_{R4}	**Actuator switches after x ms**	**Total**

The total response time is calculated as follows:

$t_{response, max} = t_{R1} + t_{R2} + t_{R3} + t_{R4}$

INFORMATION

- The total response time becomes longer when using overspeed distance monitoring of the SLS safety function.
  For an example of how to calculate the response time of overspeed distance monitoring, refer to chapter "Calculating the response time with overspeed distance monitoring".
- The total response time becomes longer when using an SS1/SS2 safety function.
- To reduce the response time, the associated safe outputs can be disabled directly depending on the status of a safety function. You find more information in the online help of MOVISAFE® Config UCS compact.
- You find the response times of the various components in the technical data of the relevant component documentation.

7.4 Checking the performance level according to EN ISO 13849-1

It has to be checked whether the required performance level (PL_r), which was determined in the risk assessment, is achieved by the chosen system for each safety function used. SEW-EURODRIVE recommends to check the calculation using the SISTEMA software tool (free of charge) of the employer's liability insurance association. SEW-EURODRIVE provides a component library which can be used as basis for the calculation. SEW-EURODRIVE offers corresponding services to support the system check by calculation.

If you use another method to validate the performance level, you can use the characteristic safety values specified in the "Technical Data" chapter.

INFORMATION

The latest version of the component library is available for download from the SEW homepage (www.sew-eurodrive.com).

8 Operation

8.1 Description of the 7-segment display

The 7-segment display is used to indicate the status of MOVISAFE®.

Status of the 7-segment display	Mode	Description
1	STARTUP	Synchronization between both processor systems and check of the configuration/firmware data.
2	SEND CONFIG	Distribution of the configuration/firmware data and another check of this data. Range check of the configuration data.
3	STARTUP BUS	Initialization of the bus system (PROFIsafe) of option UCS..B/PS.
4	RUN	Standard operation of the MOVISAFE® assembly. The program is executed cyclically.
5	STOP	In STOP mode, parameters and program data can be loaded externally.
•	RUN BUS	An active PROFIsafe interface is indicated by a blinking dot in the bottom right hand corner of the 7-segment display.
F	FAILURE	A fault can only be reset by switching the subassembly off and then on again (see chapter "Error and alarm messages").
A	ALARM	An alarm can be reset via a binary input or by pressing the "ENTER" button on the front panel (see chapter "Error and alarm messages").
E	ECS-ALARM	An ECS alarm can be reset via binary inputs or by pressing the "ENTER" button on the front panel (see chapter "Error and alarm messages").

INFORMATION

- In states 1, 2, 3 and 5, the outputs are automatically switched off by the firmware.
- In status 4, the implemented MOVISAFE® program assumes control.
- In states F and A, all outputs are disabled. If MOVISAFE® UCS..B is restarted after a reset, the outputs are enabled in status 4 and switched as programmed. If a reason for an error or alarm is still present, the outputs are disabled again and a corresponding error or alarm message is issued.
- In status E, only a message is issued. The outputs are not disabled.

8.2 Meaning of the LEDs

8.2.1 LEDs on the basic module

The status LED indicates the respective system state.

Status LED	Description
Flashing green	System ok, configuration validated
Flashing yellow	System ok, configuration not validated yet
Flashing red	Alarm
Flashing red	Failure

The RUN and SYSFault LEDs are additionally available for basic modules with PROFIsafe (/PS) function expansion.

RUN LED	SYSFault LED	Description
Off	Off	Communication interface is disabled or defective.
Orange	Flashing orange	Communication interface boots.
-	Flashing red	System error. More information on the error can be queried from the device status.
-	Flashing red	Internal communication error.
Green	-	PROFIsafe function expansion (/PS) ready for operation.
Orange	-	Communication interface ready, internal communication not yet established.

8.2.2 LEDs on the expansion module

The status LED indicates the respective system state.

Status LED	Description
Flashing green	System ok, configuration validated
Flashing yellow	System ok, configuration not validated yet
Flashing red	Alarm
Flashing red	Failure

8.2.3 LEDs on the diagnostic module

Status LED	Description
Flashing green	System ok, configuration validated

SYSFault LED	Description
Flashing green	Internal communication with the basic module. Data received.
Flashing green	Processing of received data ok.
Flashing red	Internal communication error with the basic module.
Flashing red	Device error (contact manufacturer).
Red/green flashing alternately	Self test mode.

DP LED	Description
Flashing green	Communication with PROFIBUS active.
Flashing green	Communication with PROFIBUS disrupted.
Flashing red	Transmitted data not valid.

DP LED	Description
Red/green flashing alternately	Self test mode.

PN LED	Description
Flashing green	Communication with PROFINET active.
Flashing green	Communication with PROFINET disrupted.
Flashing red	Transmitted data not valid.
Red/green flashing alternately	Self test mode.

8.3 Meaning of the ENTER function key

- You can use the ENTER function key to acknowledge a pending alarm on the safety module.
- In status 4 (RUN), pressing the ENTER function key for about 3 seconds displays the three CRC codes of the current unit configuration in the 7-segment display.

8.4 Operating states

8.4.1 Switch-on sequences

Each time MOVISAFE® UCS..B is restarted successfully, the following four phases are run through and displayed in the 7-segment display on the front of the unit.

7-segment display	Mode	Description
1	STARTUP	Synchronization between both processor systems and check of the configuration/firmware data.
2	SEND CONFIG	Distribution of the configuration/firmware data and another check of this data. Range check of the configuration data.
3	STARTUP BUS	Configuration must be activated after transmission (only when opened via MOVITOOLS® MotionStudio). MOVISAFE® UCS..B/PS waits for integration into PROFIsafe.
4	RUN	Device is ready, i.e. all outputs can be switched.

INFORMATION

The firmware automatically disables the outputs for all operating modes except for RUN. In "RUN" mode (display "4"), access is possible via the implemented PLC program or fieldbus.

8.4.2 LED display on the basic module

LED DI 01 – 14

LED display	Description
Flashing green	Signal present at binary input.

LED P1, P2

LED display	Description
Flashing green	The pulse output is available.

LED DO K1, K2

LED display	Description
Flashing green	The relay output has tripped.

8.4.3 LED display on the expansion module

LED DI 01 – 12

LED display	Description
Flashing green	Signal present at binary input.

LED P1, P2

LED display	Description
Flashing green	The pulse output is available.

LED DIO 01 – 10

LED display	Description
Flashing green	• Configured as input Signal present at binary input. • Configured as output Binary output has tripped

9 Service

9.1 General information

INFORMATION

- The safety certification and any right to claim under limited warranty become void if the user manipulates the unit internally (e.g. replacing components, welding parts).
- Changes to the module MOVISAFE® UCS..B may only be carried out by SEW-EURODRIVE.
- Only SEW-EURODRIVE is authorized to make changes to the firmware.
- Only SEW-EURODRIVE is authorized to repair MOVISAFE® UCS..B.

9.2 Function test

The proper functioning of the safety functions has to be checked once a year to ensure the safety of the module. This is done by testing the function or switch-off of the modules used in the parameterization (inputs, outputs, monitoring functions, and logic modules).

9.3 Replacement of the basic module

9.3.1 Preparation

The following components are required to perform the necessary steps for replacing the basic module:

- Programming software MOVISAFE® Config UCS compact
- Interface adapter for connecting the basic module with the PC, see chapter "Communication and establishing a connection".

Observe the following points:

- The validation report of the original startup procedure must be available.
- The configuration (original program) must be available.
- If the configuration is inhibited, you need the password to unlock it.
- The hardware and software version of the new basic module must be higher than or the same as that of the old basic module. The hardware and software version is listed on the nameplate of the basic module.
- The CRC codes (3) from the basic module must be identical with those of the configuration and the configuration report.

INFORMATION

- There are 3 different CRC codes. They are labeled with a letter and 5 numerals.
  - Program CRC (P XXXXX)
  - Parameter CRC (C XXXXX)
  - Overall CRC (L XXXXX)
- After pressing the <ENTER> key for more than 3 seconds, the CRC codes are displayed at the basic module. As an alternative, it is possible to display them in MOVISAFE® Config UCS compact (menu [Connection] / [Diagnostics] / [System information]).
- The CRC codes of the configuration are displayed in the plan management in MOVISAFE® Config UCS compact.

9.3.2 Replacing the basic module

INFORMATION

- Encoder and connection cables may only be connected or disconnected while the voltage supply is switched off.
- When using prefabricated encoder cables or the split box, the voltage can be supplied by the frequency inverter. In this case, you must also switch off the voltage supply of the frequency inverter.
- Unlocking the configuration is not required for reading and transmitting the binary file.

Proceed as follows:

1. Start the MOVISAFE® Config UCS compact software and select the respective basic module.
2. Use the PC to establish a connection with the basic module (menu [Connection] / [Connect]).
3. Read the current configuration from the basic module (menu [Connection] / [Validation] / [Read UCS binary file...]).
4. After successful transmission, save the read configuration.
5. Disconnect the connection with the basic module (menu [Connection] / [Disconnect]).
6. Switch off the voltage supply of the basic module.
7. Disconnect all encoder and connection cables from the basic module.
8. Remove the basic module from the standard profile rail.
9. Install the new basic module on the standard profile rail.
10. Connect all encoder and connection cables to the new basic module.
11. Switch on the voltage supply of the new basic module.
12. Use the PC to establish a connection with the new basic module (menu [Connection] / [Connect]).
13. Send the configuration saved under point 3 to the new basic module (menu [Connection] / [Validation] / [Send UCS binary file to UCS...]).
14. After the transmission is complete, start the new basic module (menu [Connection] / [Start]).

9.3.3 Concluding measures

After the new basic module has been installed and configured, the following final measures must be taken:

1. Perform a visual check (correct installation, swapped connections, etc.)
2. Read the three CRC codes from the new basic module. They must be identical with those of the validation report.
3. Enter the transmission counter in the validation report.
4. Enter the serial number of the new basic module in the validation report.
5. Confirm the changes in the validation report with date, name, and signature.

9.4 Replacing the expansion module

9.4.1 Preparation

The following points must be considered for performing the necessary steps for replacing an expansion module:

- The validation report of the original startup procedure must be available.
- The hardware and software version of the new expansion module must be higher than or the same as that of the old expansion module. The hardware and software version is listed on the nameplate of the expansion module.

9.4.2 Replacing the expansion module

1. Switch off the voltage supply of the basic and expansion module.
2. Disconnect all connection cables from the expansion module.
3. Remove the expansion module from the standard profile rail. This interrupts the connection to the backplane bus.
4. Read the device address from the bottom of the expansion module.
5. Set the same device address on the new expansion module.
6. Install the new expansion module on the standard profile rail. This re-establishes the connection to the backplane bus.
7. Connect all connection cables to the new expansion module.
8. Switch on the voltage supply of the basic module and the new expansion module.

9.4.3 Concluding measures

After the new expansion module has been installed and connected, the following final measures must be taken:

1. Enter the serial number of the new expansion module in the validation report.
2. Confirm the changes in the validation report with date, name, and signature.

INFORMATION

When replacing an expansion module, no new CRC code is generated. This means a validation is not necessary after the replacement.

9.5 Replacing the diagnostic module

9.5.1 Preparation

The following point must be considered for performing the necessary steps for replacing a diagnostic module:

- The hardware version of the new diagnostic module must be higher than or the same as that of the old diagnostic module. The hardware version is listed on the nameplate of the diagnostic module.

9.5.2 Replacing the diagnostic module

1. Switch off the voltage supply of the basic module and of the expansion module, if applicable.
2. Disconnect all connection cables from the diagnostic module.
3. Remove the diagnostic module from the standard profile rail. This interrupts the connection to the backplane bus.
4. Install the new diagnostic module on the standard profile rail. This re-establishes the connection to the backplane bus.
5. Connect all connection cables to the new diagnostic module.
6. Only when using UCS26B: Set the same PROFIBUS address on the new diagnostic module as on the old one.
7. Switch on the voltage supply of the basic module and (if present) the new expansion module.

9.5.3 Concluding measures

Once the new diagnostic module has been installed and connected, perform a visual check (correct installation, swapped connections, etc.).

INFORMATION

When replacing a diagnostic module, no new CRC code is generated. This means a validation is not necessary after the replacement.

9.6 Replacing an SSI absolute encoder

Two cases are distinguished when replacing an SSI absolute encoder:

Position processing in the UCS..B module	Application
Not active	Simple velocity monitoring: • No encoder offset necessary
Active	Positions are monitored: • Necessary to adjust/recalculate the encoder offset (usually with rotative encoders)

9.6.1 Replacing an SSI absolute encoder when position processing is inactive

Preparation

An SSI absolute encoder may only be replaced by the same encoder type.

Replacing an SSI absolute encoder

Proceed as follows to replace an SSI absolute encoder **without active position processing**:

1. Before replacing the encoder, switch off the mains voltage and the DC 24 V supply voltage.
2. Disconnect terminal X17 on MOVIDRIVE® B or MOVITRAC® B units, or terminal X7/X8 on MOVIAXIS®. This prevents the motor or brake from being enabled unintentionally during encoder replacement.
3. Replace the encoder in the application. Make sure that the encoder type is the same.
4. Switch the DC 24 V supply voltage and the mains voltage back on.
5. Re-connect terminal X17 (on MOVIDRIVE® B/MOVITRAC® B) or X7/X8 (on MOVIAXIS®).
6. Connect MOVISAFE® UCS..B with your PC, see chapter "Communication and establishing a connection".
7. Start the MOVISAFE® Config UCS compact software and establish a connection with the basic module.
8. Use the SCOPE function to check the plausibility of the transmitted position and velocity of your encoder.

INFORMATION

An empty program is sufficient to check the plausibility with the SCOPE function. Select UCS11B or UCS12B because the full SCOPE functionality is only available for basic modules with encoder interface.

Concluding measures

Once the new SSI absolute encoder has been installed and connected, perform a visual check (correct installation, swapped encoder connections, etc.).

9.6.2 Replacing an SSI absolute encoder when position processing is active

Preparation

The following components are required to perform the necessary steps for replacing an SSI absolute encoder when position processing is active:

- Programming software MOVISAFE® Config UCS compact
- Dongle for MOVISAFE® Config UCS compact.
- Interface adapter for connecting the basic module with the PC, see chapter "Communication and establishing a connection".

Observe the following points:

- The SSI absolute encoder may only be replaced by the same encoder type.
- The validation report of the original startup procedure must be available.
- The configuration (original program) must be on hand.
- If the configuration is inhibited, you need the password to unlock it.
- The three CRC codes from the basic module must be identical with those of the configuration and the validation report.

Replacing an SSI absolute encoder

Proceed as follows to replace an SSI absolute encoder **with active position processing**:

1. Before replacing the encoder, switch off the mains voltage and the DC 24 V supply voltage.
2. Disconnect terminal X17 on MOVIDRIVE® B or MOVITRAC® B units, or terminal X7/X8 on MOVIAXIS®. This prevents the motor or brake from being enabled unintentionally during encoder replacement.
3. Replace the encoder in the application. Make sure that the encoder type is the same.
4. Switch the DC 24 V supply voltage and the mains voltage back on.
5. Re-connect terminal X17 (on MOVIDRIVE® B/MOVITRAC® B) or X7/X8 (on MOVIAXIS®).
6. Connect MOVISAFE® UCS..B with your PC, see chapter "Communication and establishing a connection".
7. Start the MOVISAFE® Config UCS compact software and establish a connection with the basic module.
8. Use the SCOPE function to check the transmitted position and velocity of your encoder. If the displayed position is identical with the position in the application, no adjustments are necessary and you can proceed with step 18.
9. If the position of the application is not identical with the displayed position, open the original program in the MOVISAFE® Config UCS compact software. The following changes cause the CRC to be calculated again.
10. Open the encoder dialog and enter the value "0" in the "Offset" entry field.
11. Save this new configuration under another name.
12. Send the new configuration to the basic module.
13. Start the sent configuration.
14. Use the SCOPE function to check the displayed position of the encoder.
15. Re-open the encoder dialog and calculate the offset of the new SSI absolute encoder for the application.
16. Save the adjusted configuration and send it to the basic module.
17. Start the sent configuration and check the displayed position and speed of the SSI encoder again using the SCOPE function.
18. Check the displayed values for plausibility with the real values of the application.

INFORMATION

MOVISAFE® Config UCS compact offers a calculation aid for calculating the offset. You can start it in the dialog for the encoder setting, next to the offset entry.

Concluding measures

Once the new SSI absolute encoder has been installed and connected, take the following measures:

1. Perform a visual check (correct installation, swapped connections, etc.)
2. Read the three CRC codes from the basic module. Enter the CRC codes in the validation report.
3. Enter the transmission counter in the validation report.
4. Enter the new offset in the validation report.
5. Archive the changed configuration together with the original configuration.
6. Confirm the changes in the validation report with date, name, and signature.

9.7 Types of error and alarm messages

MOVISAFE® UCS..B basically distinguishes between 3 types of messages as follows.

Signal	Description	Impact on the system	Reset condition UCS..B
Error	The last active process is the operation of the 7-segment display via system A. System B is in stop mode.[1)]	All outputs are disabled	Switching MOVISAFE® off and then on again.
Alarm	Functional error caused by the external process. Both systems (A, B) continue to run cyclically.		Through parameterizable input or <ENTER> button on MOVISAFE®.
ECS	When using the ECS function in the programming interface, encoder alarm messages will be identified with "E" instead of "A".[1)]	The ECS function block returns "0" as result.	

1) Error detection in system A (odd-numbered) and system B (even-numbered).

9.7.1 Display of error or alarm messages

Errors should not occur during normal operation of the module. Error messages on MOVISAFE® UCS..B are distinguished as shown in the following overview.

Display	Meaning
F, A, E _ _ _ _	A **4-digit error message** is issued when **only one MOVISAFE® basic module** is used.
F, A, E _ _ _ _ _	A **5-digit error message** is issued when one **MOVISAFE® basic module and additional expansion modules** are used. The first digit of the error code has the following meaning: • 0: Basic module • 1: Expansion module with logic address 1 • 2: Expansion module with logic address 2

INFORMATION

All error and alarm messages are included in the user interface of the MOVISAFE® Config UCS compact software.

9.8 Disposal

Observe the applicable national regulations.

Dispose of the following materials separately in accordance with the country-specific regulations in force, as:

- Electronics scrap
- Plastics
- Sheet metal
- Copper

10 Technical Data

10.1 General technical data

MOVISAFE® UCS..B, all sizes	
Protection class	IP20 (EN 60529)
Interference immunity	Meets EN 55011 and EN 61000-6-2
Ambient temperature	−10 °C to 50 °C
Climate class	3k3 according to EN 60721-3-3
Operating life	90000 h[1)]

1) At 50 °C ambient temperature

10.2 Power consumption of the safety modules

Safety module	Maximum power consumption
UCS10B, UCS10B/PS	2.4 W
UCS11B, UCS11B/PS	2.4 W
UCS12B, UCS12B/PS	2.4 W
UCS23B	3.8 W

10.3 Technical data of the outputs

Binary outputs		
DO X.00 to DO X.01	Output voltage	DC 24 V
	Nominal output current	0.1 A
DO X.02_P	Output voltage	DC 24 V
	Nominal output current	0.5 A
DO X.02_M	Output voltage	GND
	Nominal output current	0.5 A
DO X.03_P	Output voltage	DC 24 V
	Nominal output current	0.25 A
DO X.03_M	Output voltage	GND
	Nominal output current	0.25 A
DIO X.01 to DIO X.10	Output voltage	DC 24 V
	Nominal output current	0.25 A
Relay outputs		
K 0.1	Capacity of the relay contact	U_{max} = DC 24 V, I_{max} = 2 A and U_{max} = AC 230 V, I_{max} = 2 A
	Max. switching frequency	2 800 000 (at nominal load)
K 0.2	Capacity of the relay contact	U_{max} = DC 24 V, I_{max} = 2 A and U_{max} = AC 230 V, I_{max} = 2 A
	Max. switching frequency	2 800 000 (at nominal load)
Pulse outputs		
P1	Output voltage	DC 24 V with fixed pulse pattern
	Nominal output current	0.1 A (sum P1 + P2)
P2	Output voltage	DC 24 V with fixed pulse pattern
	Nominal output current	0.1 A (sum P1 + P2)

INFORMATION

- X = 0: Basic module
- X = 1: 1st expansion module
- X = 2: 2nd expansion module

10.4 Safety characteristics of basic modules

10.4.1 MOVISAFE® UCS10B

	Characteristic values according to	
	EN 62061/IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL 3 to IEC 61508	PL e
System structure	1oo2D	2 channels (corresponds to category 4)
Operating mode selection	"High demand" to IEC 61508	
Probability of dangerous failure per hour (PFHd value)	3×10^{-9} 1/h	
Mission time / service life	20 years	
Proof test interval	20 years	-
Safe condition	Value "0" for all safety-related F-DO process values (output disabled)	
Safety function	• Safe logic processing • Safe digital inputs/outputs • Safe relay outputs	

10.4.2 MOVISAFE® UCS10B/PS

	Characteristic values according to	
	EN 62061/IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL 3 according to IEC 61508	PL e
System structure	1oo2D	2 channels (corresponds to category 4)
Operating mode selection	"High demand" according to IEC 61508	
Probability of dangerous failure per hour (PFHd value)	3×10^{-9} 1/h	
Mission time / service life	20 years	
Proof test interval	20 years	-
Safe condition	Value "0" for all safety-related F-DO process values (output disabled)	
Safety function	• Safe logic processing • Safe digital inputs/outputs • Safe relay outputs • Safe communication via CAN-S	

10.4.3 MOVISAFE® UCS11B

	Characteristic values according to	
	EN 62061/IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL 3 according to IEC 61508	PL e
System structure	1oo2D	2 channels (corresponds to category 4)
Operating mode selection	"High demand" according to IEC 61508	
Probability of dangerous failure per hour (PFHd value)	2.2×10^{-9} 1/h	
Mission time / service life	20 years	
Proof test interval	20 years	-
Safe condition	Value "0" for all safety-related F-DO process values (output disabled)	
Safety function	• STO, SS1, SS2, SOS, SLA, SAR, SLS, SSR, SLP, SLI, SDI, SCA, SSM according IEC 61800-5-2 • Safe logic processing • Safe digital inputs/outputs • Safe relay outputs	

10.4.4 MOVISAFE® UCS11B/PS

	Characteristic values according to	
	EN 62061/IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL 3 according to IEC 61508	PL e
System structure	1oo2D	2 channels (corresponds to category 4)
Operating mode selection	"High demand" according to IEC 61508	
Probability of dangerous failure per hour (PFHd value)	2.2×10^{-9} 1/h	
Mission time / service life	20 years	
Proof test interval	20 years	-
Safe condition	Value "0" for all safety-related F-DO process values (output disabled)	
Safety function	• STO, SS1, SS2, SOS, SLA, SAR, SLS, SSR, SLP, SLI, SDI, SCA, SSM according IEC 61800-5-2 • Safe logic processing • Safe digital inputs/outputs • Safe relay outputs • Safe communication via CAN-S	

10.4.5 MOVISAFE® UCS12B

	Characteristic values according to	
	EN 62061/IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL 3 according to IEC 61508	PL e
System structure	1oo2D	2 channels (corresponds to category 4)
Operating mode selection	"High demand" according to IEC 61508	
Probability of dangerous failure per hour (PFHd value)	6.2×10^{-9} 1/h	
Mission time / service life	20 years	
Proof test interval	20 years	-
Safe condition	Value "0" for all safety-related F-DO process values (output disabled)	
Safety function	• STO, SS1, SS2, SOS, SLA, SAR, SLS, SSR, SLP, SLI, SDI, SCA, SSM according IEC 61800-5-2 • Safe logic processing • Safe digital inputs/outputs • Safe relay outputs	

10.4.6 MOVISAFE® UCS12B/PS

	Characteristic values according to	
	EN 62061/IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL 3 according to IEC 61508	PL e
System structure	1oo2D	2 channels (corresponds to category 4)
Operating mode selection	"High demand" according to IEC 61508	
Probability of dangerous failure per hour (PFHd value)	6.2×10^{-9} 1/h	
Mission time / service life	20 years	
Proof test interval	20 years	-
Safe condition	Value "0" for all safety-related F-DO process values (output disabled)	
Safety function	• STO, SS1, SS2, SOS, SLA, SAR, SLS, SSR, SLP, SLI, SDI, SCA, SSM according IEC 61800-5-2 • Safe logic processing • Safe digital inputs/outputs • Safe relay outputs • Safe communication via CAN-S	

10.5 Safety characteristics of expansion module

10.5.1 MOVISAFE® UCS23B

	Characteristic values according to	
	EN 62061/IEC 61508	**EN ISO 13849-1**
Classification/underlying standards	SIL 3 according to IEC 61508	PL e
System structure	1oo2D	2 channels (corresponds to category 4)
Operating mode selection	"High demand" according to IEC 61508	
Probability of dangerous failure per hour (PFHd value)	2.6×10^{-9} 1/h	
Mission time / service life	20 years	
Proof test interval	20 years	-
Safe condition	Value "0" for all safety-related F-DO process values (output disabled)	
Safety function	Safe digital inputs/outputs	

10.6 MOVISAFE® response times

The response time is an important safety-related value and must be considered for any application. The following section lists response times for individual functions. If this data is insufficient for a specific application, you have to perform a measurement to validate the actual behavior.

INFORMATION

- On startup or after a fault or alarm reset, the outputs can be active for the duration of the response time depending on the configuration. You have to take this into account when you plan the safety function.
- You have to specify the response times for each safety function and compare it to the actual value according to the following information.
- If you use filter functions, you have to be especially careful. The filter length or filter time can cause a significant increase of the response time. This must be taken into account for the safety-related planning.
- If the "distance monitoring" filter is used, the response time will increase depending on the set error distance.
- For particularly critical applications, you must perform measurements to validate the time behavior.

10.6.1 Response times of the basic modules

The calculation of response times for MOVISAFE® UCS..B is based on the cycle time of the system. The cycle time (t_{cycle}) is 8 ms. The specified response times correspond to the maximum run time for the specific application **within MOVISAFE®**. Depending on the application, additional application-specific response times, e.g. for filter functions or the sensors and actuators used, have to be added to obtain the total run time.

Function	Response time ms
Activating a monitoring function via ENABLE with subsequent disabling of a digital output.	24[1)]
Activating a monitoring function via ENABLE with subsequent disabling of a safety relay.	47[1)]
Response of an already activated **monitoring function** and disabling of a digital output (including PLC processing for position and velocity processing).	16[1)]
Response of an already activated **monitoring function** and disabling of a safety relay (including PLC processing for position and velocity processing).	39[1)]
Enabling a digital input and disabling a digital output.	16
Enabling a digital input and enabling a relay output.	26
Disabling a digital input and disabling a digital output.	16
Disabling a digital input and disabling a relay output.	47
Mean value filter (speed filter) (Setting, see encoder configuration in MOVISAFE® Config UCS. This run time only affects monitoring functions in conjunction with position/velocity/acceleration, not the logic processing)	0, 16, 24, 32, 40, 48, 56, 64

1) When the mean value filter is activated, the response time increases according to the filter value

10.6.2 Response times of UCS23B expansion modules

The calculation of response times for MOVISAFE® UCS..B is based on the cycle time of the system. The cycle time (t_{cycle}) is 8 ms. The specified response times correspond to the maximum run time for the specific application **within MOVISAFE®**. Depending on the application, additional application-specific response times, e.g. for filter functions or the sensors and actuators used, have to be added to obrain the total run time.

Function	Designation	Response time ms
Time for an input signal at the basic module to the PAE (e.g. activation of a monitoring function).	$t_{IN-BASE}$	10
Time for an input signal at the expansion module to the PAE (e.g. activation of a monitoring function).	t_{IN-23}	18
Processing time PAE to PAA in the basic module (e.g. disconnection in the PAE via monitoring function or input).	t_{PLC}	8
Enabling/disabling a digital output in the basic module after a change in the PAA.	$t_{OUT-BASE}$	0
Enabling/disabling a digital output in the expansion module after a change in the PAA.	t_{OUT-23}	8

Evaluation of the total response time

Example 1:

- Input on expansion module
- Activation of a safety function
- Processing in PLC
- Switching of an output on the basic module

$t_{RESPONSE} = t_{IN-23} + t_{PLC} + t_{OUT-BASE} = 18\ ms + 8\ ms + 0\ ms = 26\ ms$

Example 2:

- Input on basic module
- Activation of a safety function
- Processing in PLC
- Switching of an output on the expansion module

$t_{RESPONSE} = t_{IN-BASE} + t_{PLC} + t_{OUT-23} = 10\ ms + 8\ ms + 8\ ms = 26\ ms$

Example 3:

- Input on expansion module
- Activation of a safety function
- Processing in PLC
- Switching of an output on the expansion module

$t_{RESPONSE} = t_{IN-23} + t_{PLC} + t_{OUT-23} = 18\ ms + 8\ ms + 8\ ms = 34\ ms$

10.6.3 Response times for Fast_Channel

Fast_Channel refers to a MOVISAFE® characteristic that allows for a faster response to a safety function with speed requirements than in normal cycle. The sampling time of the Fast_Channel is 2 ms. The response time is 4 ms.

INFORMATION

- The function can be activated in the safety functions SLS and SOS in MOVISAFE® Config UCS compact.
- A disconnection during the mentioned response time (when a speed threshold is exceeded) is only possible if the encoder system provides sufficient resolution. The smallest resolvable switching threshold of the Fast_Channel requires at least 2 edge changes at the selected encoder system within 2 ms.
- Fast_Channel is only possible in conjunction with binary outputs.

10.6.4 Response times for overspeed distance monitoring

If you use the "overspeed distance monitoring" for speed monitoring in SLS or SCA safety functions, the total response time of the MOVISAFE® UCS..B increases by the response time (runtime) of the filter. The filter shifts the set speed threshold upwards. For the application, you have to take into account the additional response time as well as the resulting speed in the event of a disconnection via MOVISAFE® UCS..B. The following two cases are distinguished. The safety function performs a disconnection once the configured permitted distance has been reached.

1. Faulty acceleration beyond the monitored velocity.

$$t_R = \sqrt{\frac{2 \times s_F}{a}} + 2 \times t_{UCS}$$

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t_R = Response time of the MOVISAFE® UCS..B (incl. response time of the overspeed distance monitoring)
s_F = Permitted distance of the overspeed distance monitoring (configurable value in safety function)
a = Permitted maximum acceleration, depending on the monitored axis (according to project planning)
t_{UCS} = Cycle time of the MOVISAFE® UCS..B (see chapter "Technical Data")

2. Constant travel above the monitored velocity.

$$t_R = \frac{s_F}{v_x - v_0} + 2 \times t_{UCS}$$

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v_x = Current speed off the monitored axis
v_0 = Monitored speed (SLS/SCA configured value in safety function)
t_R = Response time of the MOVISAFE® UCS..B (incl. response time of the overspeed distance monitoring)
s_F = Permitted distance of the overspeed distance monitoring (configurable value in safety function)
t_{UCS} = Cycle time of the MOVISAFE® UCS..B (see chapter "Technical data")

10.7 Diagnostic values

The diagnostic values specify the diagnostic coverage (DC value) that can be assumed for calculating the performance level.

10.7.1 Binary inputs

INFORMATION

- Refer to the manufacturer's specifications ($MTTF_d$, FIT numbers, etc.) for the safety-relevant evaluation of the sensor subsystem.
- The DC values listed in the table should be applied conservatively to ensure compliance with the boundary conditions ("Comment" column).
- Fault exclusions are permitted according to the relevant standards. The specified boundary conditions must be permanently ensured.
- If several sensor systems are required for an individual safety function to work properly, their partial value must be combined correctly according to the selected method.

Input element properties	Parameterized/operational tests				DC	Definition of the measure	Comment
	A[1)]	B[2)]	C[3)]	D[4)]			
Single channel			x	x	> 60	Cyclical test pulse by changing the input signals dynamically.	A sufficiently high test rate must be ensured.
	x				90	Cyclical test pulse by changing the input signals dynamically.	Only effective if pulse assignment is active.
	x		x	x	90 – 99	Cyclical test pulse by changing the input signals dynamically.	DC depends on frequency of start/cyclical tests. DC = 90 Test only at intervals of > 4 weeks. DC = 99 Test at least 1 × per day/or 100 times the request rate

Input element properties	Parameterized/operational tests				DC	Definition of the measure	Comment
	A[1]	B[2]	C[3]	D[4]			
Dual channel					90	Cross comparison of input signals with dynamic test if short circuits cannot be detected (with multiple inputs/outputs).	With fault exclusion, short circuit possible up to DC = 99.
			x	x	90 – 99	Cyclical test pulse by changing the input signals dynamically.	DC depends on frequency of start/cyclical tests.
	x				99	Cross comparison of input signals and intermediate results in the logic (L) and temporal monitoring of the logical program run as well as detection of static failures and short circuits (with multiple inputs/outputs).	Only effective if pulse assignment is active.
		x			99	Plausibility check, for example using the NO and NC contacts = antivalent signal comparison of input elements.	Only effective in conjunction with active time monitoring function for input element.

1) A = cross fault test
2) B = time monitoring (< 3 s)
3) C = start test
4) D = cyclical test during operation

10.7.2 Binary outputs

INFORMATION

- For a safety assessment of the output subsystem when using external elements in the switch-off circuit, e.g. for switching amplification, the manufacturer's specification ($MTTF_d$, FIT values, B_{10d} value, etc.) must be used.
- The DC values listed in the table should be applied conservatively to ensure compliance with the boundary conditions ("Comment" column).
- Fault exclusions are permitted according to the relevant standards. The specified boundary conditions must be permanently ensured.
- When using elements to amplify signals in safety circuits, the function of these elements must be monitored using suitable feedback contacts, etc. Suitable feedback contacts are contacts that are connected with the contacts in the cut-off circuit in a forced-switching manner.

Measure	DC value	Comment	Use
Cross comparison of output signals and direct and intermediate results in the logic (L) and temporal monitoring of the logical program run as well as detection of static failures and short circuits (with multiple inputs/outputs).	99 89[1)]	When using elements to amplify switching (external relays or contactors), the measure is only effective together with the feedback function of switch contacts (EMU function).	Monitoring of outputs with direct function as safety circuit, or monitoring of safety circuits with elements to amplify switching in conjunction with feedback function of their outputs.

1) DC value applies to the configurable binary inputs/outputs when configured as static binary output.

10.7.3 General diagnostics for encoder interface

Diagnostics for sensors for position and/or speed detection.

Measure	DC value	Comment	Use
Cross comparison of input signals and direct and intermediate results in the logic (L) and temporal monitoring of the logical program run as well as detection of static failures and short circuits (with multiple inputs/outputs).	99	Use only for: • Two-channel sensor systems (2 separate sensors) • Dual-channel subsystem of sensors (incremental encoders) • Diagnostics for the single- and dual-channel subsystem of specifically suited sensor systems (SIN/COS encoders) • Dynamic operation/no standstill monitoring	Monitoring of dual-channel sensor systems or the relevant subsystem of sensors for dynamic operation. Do not use for standstill monitoring.
Cross comparison of input signals without dynamic test.	80 – 95%	The DC value depends on the following factors: frequency of the dynamic state, which is standstill or movement, and the quality of the monitoring measure (80 – 90% for incremental encoders, 95% for SIN/COS encoders)	Monitoring of dual-channel sensor systems or subsystem of sensors for non-dynamic operation. To be used in particular for standstill monitoring!
Monitoring of some sensor characteristics (response time, range of analog signals, such as electrical resistance, capacitance)	60	Diagnostics of specific sensor characteristics. Only for velocity and position sensors.	Monitoring of the single-channel subsystem of single-channel sensors.

INFORMATION

- Refer to the manufacturer's specifications ($MTTF_d$, FIT numbers, etc.) for the safety-relevant evaluation of the sensor subsystem.
- If the manufacturer requires specific diagnostic measures to ensure the specified safety-relevant values, these measures must be checked according to the previous table with respect to the specific encoder. If you are in doubt, please contact the manufacturer.
- The DC values listed in the table should be applied conservatively to ensure compliance with the boundary conditions ("Comment" column).
- An estimate of the frequency of the dynamic state might be necessary to determine the DC value for safety functions with standstill monitoring. A DC value of 90% can be assumed as guide value.
- Fault exclusions are permitted according to the relevant standards. The specified boundary conditions must be permanently ensured.
- If several sensor systems are required for an individual safety function to work properly, their partial value must be combined correctly according to the selected method. This also applies to a combination of sensors (such as safely reduced speed with open safety door = door contact + encoder for speed detection).
- A sufficiently low tolerance with respect to the cut-off thresholds of the individual safety functions must be ensured by selecting a suitable resolution of the sensor system.

10.8 Specification of encoder interfaces

10.8.1 Absolute encoder

Connection to X7 or X8

Data interface	SSI
Frame Length	10 to 31 bits (variable configuration)
Data Length	10 to 31 bits (variable configuration)
Status Length	0 to 5 bits (variable configuration) For evaluating fault, warning and operating states
Data format	Binary or Gray code data format
Physical Layer	RS422-compliant
Slave operation (Listener)	• Max. external clock rate: 200 kHz • Min. clock pulse off time: 30 µs • Max. clock pulse off time: 1 ms
Master mode	Clock rate: 150 kHz

Diagnostics	Parameter	Fault threshold
Supply voltage monitoring	Configurable to 5 V, 8 V, 10 V, 12 V, 20 V or 24 V	±20% ±2% (measuring tolerance)
Monitoring off the difference levels at the input	RS485 level	±20% ±2% (measuring tolerance)
Clock rate monitoring		100 kHz < f < 350 kHz
Plausibility velocity compared to position		ΔP > 2 × v × t ΔP = position change v = current velocity t = 8 ms
Short circuits between the signals	-	-
Interruptions of the signals	-	-
Stuck at 0 or 1 on one or all signals	-	-

10.8.2 TTL encoder

Connection to X7 or X8

Physical Layer	RS422-compliant
Measuring signal A/B	Track with 90° phase difference
Max. input frequency	200 kHz

Diagnostics	Parameter	Fault threshold
Supply voltage monitoring	Configurable to 5 V, 8 V, 10 V, 12 V, 20 V or 24 V	±20% ±2% (measuring tolerance)
Monitoring off the difference levels at the input	RS485 level	±20% ±2% (measuring tolerance)
Monitoring of the input frequency separated for track A and B		ΔP > 4 increments ΔP = position change
Short circuits between the signals	-	-
Interruptions of the signals	-	-
Stuck at 0 or 1 on one or all signals	-	-

10.8.3 SIN/COS encoder

Connection to X7 or X8

Physical Layer	±0.5 V_{ss} (without voltage offset)
SIN/COS measuring signal	Track with 90° phase difference
Max. input frequency	200 kHz

Diagnostics	Parameter	Fault threshold
Supply voltage monitoring	Configurable to 5 V, 8 V, 10 V, 12 V, 20 V or 24 V	±20% ±2% (measuring tolerance)
Monitoring of the amplitude $SIN^2 + COS^2$	1 V_{pp}	65 of 1 V_{pp} ±2.5% (measuring tolerance)
Monitoring of the SIN/COS phase	90 °	±30°, ±5% (measuring tolerance)
Short circuits between the signals	-	-
Interruptions of the signals	-	-
Stuck at 0 or 1 on one or all signals	-	-

10.8.4 HTL proximity sensor

Connection to X32.

Signal level	DC 24 V/0 V
Max. input frequency	6 kHz, circuit logic of the HTL proximity sensor must be debounced.

10.8.5 HTL proximity sensor with advanced monitoring

Connection to X32.

Signal level	DC 24 V/0 V
Max. input frequency	4 kHz, circuit logic of the HTL proximity sensor must be debounced.
Max. blanking of 0-signal	50%
Min. coverage	10%

Advanced monitoring can be activated in the encoder combination HTL 1Z/HTL 1Z when configuring HTL proximity sensors in MOVISAFE® Config UCS compact. Advanced monitoring requires a switching gate on the shaft and detects the following faults:

- Supply voltage failure
- Output signal failure in direction of the driver
- Function failure of the high signal on the proximity sensor
- Signal disruption
- Mechanical misadjustement (e.g. sensing distance too large)

For diagnostic purposes, the two states of the HTL count signal are detected synchronously and are compared logically. A switching gate has to ensure the attenuation of at least one of the HTL count signals. The logic in MOVISAFE® UCS..B evaluates the layout specification.

10.9 Plug connectors of the basic module

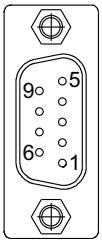
10.9.1 Connector assignment, X6

Type: RJ10 plug connector

X6	Signal description	Specification
 2147805451	• Parameter setting and diagnostic interface • Point-to-point connection (e.g. UWS21B, USB11A)	Asynchronous, RS485 Baud rate: 38.4 kBaud Data bit: 8 Parity: no Stop bit: 1

10.9.2 Connector assignment X7/X8

Type: D-sub socket

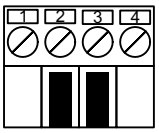
X7/X8	PIN	TTL encoder	SIN/COS encoder	SSI encoder
 1984587275	1	N.C.	N.C.	N.C.
	2	DGND	DGND	DGND
	3	N.C.	N.C.	N.C.
	4	$\overline{B}$	SIN-	Pulse –
	5	A	COS+	DATA+
	6	$\overline{A}$	COS-	DATA−
	7	N.C.	N.C.	N.C.
	8	B	SIN+	Pulse +
	9	U_s	U_s	U_s

INFORMATION

The inner resistance of the encoder interface X7/X8 is adjusted to a signal split between SEW frequency inverter and safety module UCS..B. Direct connection might make it necessary to adjust the load impedance according to the specifications of the encoder supplier (typical value = 120 Ω).

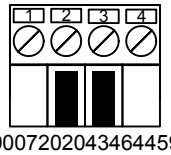
10.9.3 Connector assignment X11

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043435915	1	DC+24 V	DC 24 V voltage supply	DC 20.4 V – 27.6 V
	2	DC+24 V		
	3	0V24	0 V reference potential	-
	4	0V24		

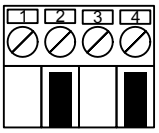
10.9.4 Connector assignment X12

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043464459	1	U_ENC_1	Encoder supply voltage X7	DC 5 V – 24 V
	2	GND_ENC_1	Reference potential for encoder supply voltage X7	-
	3	DO 0.00	Auxiliary output	DC 24 V, 0.1 A
	4	DO 0.01	Auxiliary output	DC 24 V, 0.1 A

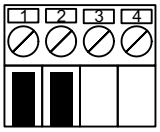
10.9.5 Connector assignment X13

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043467403	1	U_ENC_2	Encoder supply voltage X8	DC 5 V – 24 V
	2	GND_ENC_2	Reference potential for encoder supply voltage X8	-
	3	N.C.	-	-
	4	N.C.		

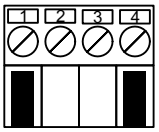
10.9.6 Connector assignment X21

4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043471883	1	DI 0.13	Binary input 13	DC 24 V, suitable for OSSD
	2	DI 0.14	Binary input 14	DC 24 V, suitable for OSSD
	3	P1	Pulse output 1 for crossfault monitoring	24 V with fixed pulse pattern Max. 0.25 A (sum P1 + P2)
	4	P2	Pulse output 2 for crossfault monitoring	

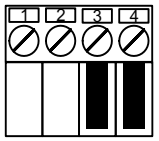
10.9.7 Connector assignment X22

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043474827	1	DI 0.01	Binary input 1	DC 24 V, suitable for OSSD
	2	DI 0.02	Binary input 2	DC 24 V, suitable for OSSD
	3	DI 0.03	Binary input 3	DC 24 V, suitable for OSSD
	4	DI 0.04	Binary input 4	DC 24 V, suitable for OSSD

10.9.8 Connector assignment X31

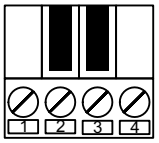
Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043554571	1	DO 0.02_P	HISIDE output 2	DC 24 V, 0.5 A
	2	DO 0.02_M	LOSIDE output 2	DGND, 0.5 A
	3	DO 0.03_P	HISIDE output 3	DC 24 V, 0.25 A
	4	DO 0.03_M	LOSIDE output 3	DGND, 0.5 A

10.9.9 Connector assignment X32

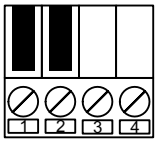
Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

HTL counting input	
Signal level	DC 24 V / 0 V
Pulse frequency	Max. 6 kHz (switching logic debounced)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043557515	1	DI 0.05	Binary input 5/HTL proximity sensor	DC 24 V
	2	DI 0.06	Binary input 6/HTL proximity sensor	DC 24 V
	3	DI 0.07	Binary input 7/HTL proximity sensor	DC 24 V
	4	DI 0.08	Binary input 8/HTL proximity sensor	DC 24 V

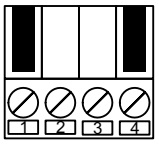
10.9.10 Connector assignment X41

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assign-ment	Signal description	Specification
 9007202043560459	1	K 0.11	Relay 1, contact 1	DC 24 V, 2 A or AC 230 V, 2 A
	2	K 0.12	Relay 1, contact 2	
	3	K 0.21	Relay 2, contact 1	DC 24 V, 2 A or AC 230 V, 2 A
	4	K 0.22	Relay 2, contact 2	

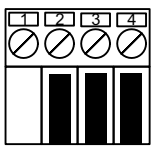
10.9.11 Connector assignment X42

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043565963	1	DI 0.09	Binary input 9	DC 24 V, suitable for OSSD
	2	DI 0.10	Binary input 10	DC 24 V, suitable for OSSD
	3	DI 0.11	Binary input 11	DC 24 V, suitable for OSSD
	4	DI 0.12	Binary input 12	DC 24 V, suitable for OSSD

10.9.12 Connector assignment XCS

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

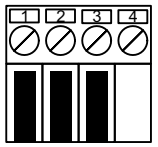
Coding	Terminal	Assignment	Signal description	Specification
 3465393803	1	CAN_High	CAN-S	Connection to PROFIsafe via gateway
	2	CAN_Low		
	3	GND		
	4	N.C.	-	120 Ω terminating resistor for CAN-S

INFORMATION

A cable jumper between pins 1 and 4 terminate the CAN-S with 120 Ω.

10.9.13 Connector assignment XCD

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 3465422347	1	CAN_High	CAN (SBus)	SBus communication
	2	CAN_Low		
	3	GND		
	4	N.C.	-	120 Ω terminating resistor for CAN

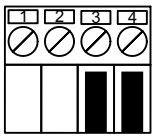
INFORMATION

A cable jumper between pins 1 and 4 terminate the CAN with 120 Ω.

10.10 Plug connectors of the expansion module

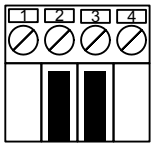
10.10.1 Connector assignment X15

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043696907	1	DC+24 V	DC 24 V voltage supply	DC 20.4 V – 27.6 V
	2	DC+24 V		
	3	0V24	0 V reference potential	-
	4	0V24		

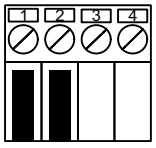
10.10.2 Connector assignment X16

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043699851	1	N. C.	-	-
	2	N. C.		
	3	DO X.0	Auxiliary output	DC 24 V, 0.1 A
	4	DO X.1	Auxiliary output	DC 24 V, 0.1 A

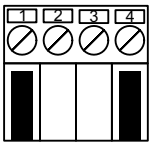
10.10.3 Connector assignment X25

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043704331	1	DIO X.01	Configurable binary input/ output 1	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	2	DIO X.02	Configurable binary input/ output 2	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	3	P1	Pulse output 1 for cross-fault monitoring	24 V with fixed pulse pattern Max. 0.25 A (sum P1 + P2)
	4	P2	Pulse output 2 for cross-fault monitoring	

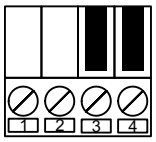
10.10.4 Connector assignment X26

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043860875	1	DI X.01	Binary input 1	DC 24 V, suitable for OSSD
	2	DI X.02	Binary input 2	DC 24 V, suitable for OSSD
	3	DI X.03	Binary input 3	DC 24 V, suitable for OSSD
	4	DI X.04	Binary input 4	DC 24 V, suitable for OSSD

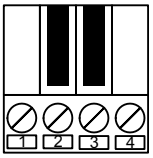
10.10.5 Connector assignment X35

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043863819	1	DIO X.03	Configurable binary input/ output 3	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	2	DIO X.04	Configurable binary input/ output 4	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	3	DIO X.05	Configurable binary input/ output 5	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	4	DIO X.06	Configurable binary input/ output 6	DC 24 V, suitable for OSSD DC 24 V, 0.25 A

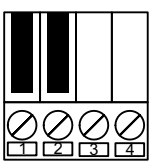
10.10.6 Connector assignment X36

Type: 4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043866763	1	DI X.05	Binary input 5	DC 24 V
	2	DI X.06	Binary input 6	DC 24 V
	3	DI X.07	Binary input 7	DC 24 V
	4	DI X.08	Binary input 8	DC 24 V

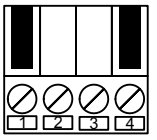
10.10.7 Connector assignment X45

4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202043871755	1	DIO X.07	Configurable binary input/ output 7	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	2	DIO X.08	Configurable binary input/ output 8	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	3	DIO X.09	Configurable binary input/ output 9	DC 24 V, suitable for OSSD DC 24 V, 0.25 A
	4	DIO X.10	Configurable binary input/ output 10	DC 24 V, suitable for OSSD DC 24 V, 0.25 A

10.10.8 Connector assignment X46

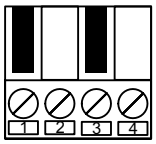
4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment	Signal description	Specification
 9007202044015499	1	DI X.09	Binary input 9	DC 24 V, suitable for OSSD
	2	DI X.10	Binary input 10	DC 24 V, suitable for OSSD
	3	DI X.11	Binary input 11	DC 24 V, suitable for OSSD
	4	DI X.12	Binary input 12	DC 24 V, suitable for OSSD

10.11 Plug connectors of the diagnostic module

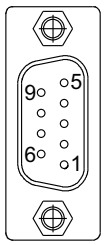
10.11.1 Connector assignment X49 on UCS25B

4-pole Phoenix terminal, max. core cross section 1.5 mm^2 (AWG16)

Coding	Terminal	Assignment
 9007202044019467	1	CAN High
	2	CAN Low
	3	DGND
	4	N.C.

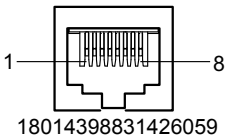
10.11.2 Connector assignment XDP on UCS26B

Type: D-sub socket

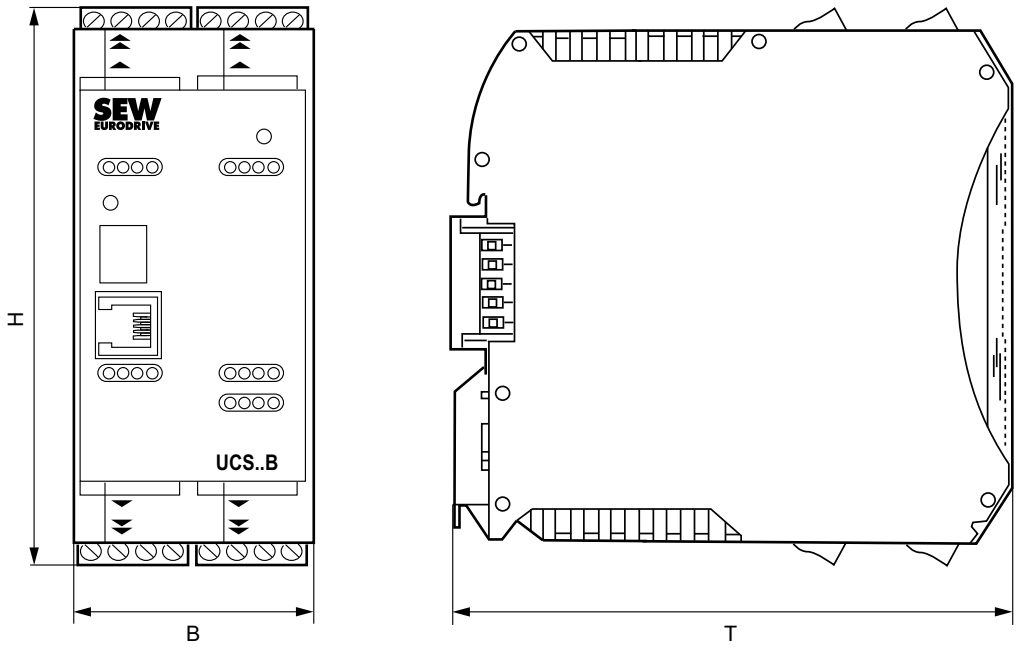
XDP	PIN	Signal
 1984587275	1	N.C.
	2	N.C.
	3	Data B
	4	N.C.
	5	GND bus
	6	+5 V bus
	7	N.C.
	8	Data A
	9	N.C.

10.11.3 Connector assignment XPN on UCS27B

Type: RJ45 plug connector

XPN	PIN	Signal	Description
 18014398831426059	1	TD+	Transmission Data +
	2	TD−	Transmission Data −
	3	RD+	Receive Data +
	4	N.C.	N.C.
	5	N.C.	N.C.
	6	RD−	Receive Data −
	7	N.C.	N.C.
	8	N.C.	N.C.

10.12 Dimension drawing



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MOVISAFE®	Size (H × D × W)		Weight	Mounting
	mm	in	kg	
UCS10B	100 × 115 × 67.5	3.94 × 4.53 × 1.77	0.30	Mounted to standard profile rail
UCS10B/PS	100 × 115 × 67.5	3.94 × 4.53 × 2.66	0.39	
UCS11B	100 × 115 × 45	3.94 × 4.53 × 1.77	0.31	
UCS11B/PS	100 × 115 × 67.5	3.94 × 4.53 × 2.66	0.40	
UCS12B	100 × 115 × 67.5	3.94 × 4.53 × 2.66	0.39	
UCS12B/PS	100 × 115 × 90	3.94 × 4.53 × 3.54	0.48	
UCS23B	100 × 115 × 45	3.94 × 4.53 × 1.77	0.3	
UCS25B	100 × 115 × 22.5	3.94 × 4.53 × 0.89	0.10	
UCS26B	100 × 115 × 22.5	3.94 × 4.53 × 0.89	0.10	
UCS27B	100 × 115 × 22.5	3.94 × 4.53 × 0.89	0.10	

11 Declaration of Conformity

11.1 MOVISAFE® UCS10B, UCS11B, UCS12B, UCS23B

EC Declaration of Conformity

SEW EURODRIVE

900190010

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

safety components of the series	**MOVISAFE® UCS10B** **MOVISAFE® UCS11B** **MOVISAFE® UCS12B** **MOVISAFE® UCS23B**	
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
applied harmonized standards	**EN 13849-1:2008** **EN 60204-1:2007** **EN 50178:1997** **EN 13850:2006** **EN 62061: 2006** **EN 574:1996**	**5)**

1) These products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal	11.12.09	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

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11.2 MOVISAFE® UCS10B/PS, UCS11B/PS, UCS12B/PS

EC Declaration of Conformity

SEW EURODRIVE

901500012

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

safety components of the series	**MOVISAFE® UCS10B/PS** **MOVISAFE® UCS11B/PS** **MOVISAFE® UCS12B/PS**	
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
EMC Directive	**2004/108/EC**	**4)**
Applied harmonized standards	**EN ISO 13849-1:2008** **EN 13850:2008** **EN 574:1996 + A1:2008** **EN 55011:2007** **EN 62061:2005**	**5)** **5)**
Applied non-harmonized standards:	**IEC 61508 Part 1-7:2010**	

1) The products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal	16.07.12	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

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12 Appendix

12.1 Description of input elements

12.1.1 General information

Prefabricated input elements are available for programming the logic via MOVISAFE® Config UCS compact. The input elements can be freely assigned to the digital inputs of the basic and expansion modules.

12.1.2 Enabling button

Switch type	Comment
1 NC contact	Confirmation button, basic
1 NO contact	Confirmation button, basic
2 NC contacts	Confirmation button, increased demands
2 NC contacts, time-monitored	Confirmation button, monitored

12.1.3 EMERGENCY STOP

Switch type	Comment
1 NC contact	EMERGENCY STOP, basic
2 NC contacts	EMERGENCY STOP, for increased demands
2 NC contacts, time-monitored	EMERGENCY STOP, monitored

12.1.4 Door monitoring

Switch type	Comment
2 NC contacts	Door monitoring for increased demands
2 NC contacts, time-monitored	Door monitoring, monitored
1 NC contact + 1 NO contact	Door monitoring for increased demands
1 NC contact + 1 NO contact time-monitored	Door monitoring, monitored
2 NC contacts + 2 NO contacts	Door monitoring for increased demands
2 NC contacts + 2 NO contacts time-monitored	Door monitoring, monitored
3 NC contacts	Door monitoring for increased demands
3 NC contacts, time-monitored	Door monitoring, monitored

12.1.5 Two-hand control

Switch type	Comment
2 changers	Two-hand control, increased demand, type III C
2 NO contacts	Two-hand control, monitored, type III A

INFORMATION

- Users cannot change the fixed pulse assignment specified for these input elements.
- The two-hand control is available for the logic once.

12.1.6 Limit switches

Switch type	Comment
1 NC contact	Limit switch, basic
1 NO contact	Limit switch, basic
2 NC contacts	Limit switch, increased demands
2 NC contacts, time-monitored	Limit switch, monitored

12.1.7 Light curtain

Switch type	Comment
2 NC contacts	Light curtain, increased demands
2 NC contacts, time-monitored	Light curtain, monitored
1 NC contact + 1 NO contact	Light curtain, increased demands
1 NC contact + 1 NO contact time-monitored	Light curtain, monitored

INFORMATION

You cannot configure the light curtain input element for the binary inputs DI 0.05 to DI 0.08 on the basic module.

12.1.8 Operating mode switch

Switch type	Comment
Selector switch NC contact + NO contact	Operating mode selection switch, monitored
3-level selector switch	
4-level selector switch	

INFORMATION

If you change the state of the operating mode selection switch, you must design the logic in MOVISAFE® Config UCS compact in such a way that the MOVISAFE® outputs are disabled (EN 60204-1).

12.1.9 Sensor

Switch type	Comment
1 NC contact	Sensor basic
1 NO contact	Sensor basic
2 NC contacts	Sensor, increased demands
2 NC contacts, time-monitored	Sensor, monitored
1 NC contact + 1 NO contact time-monitored	Sensor, monitored

12.1.10 Start/reset

Switch type	Comment
1 NO contact	Alarm reset (edge control)
1 NO contact	Logic reset
1 NO contact	Start monitoring, basic (special function)

12.2 Reference tables of the inputs and outputs

The following reference tables list the designations of the inputs and outputs in this documentation and in the user interface of the MOVISAFE® Config UCS compact software.

12.2.1 Inputs on the basic module

UCS10B/11B/12B:

Documentation	Designation in MOVISAFE® Config UCS compact	Function
DI 0.01	E 0.1	Binary input 1
DI 0.02	E 0.2	Binary input 2
DI 0.03	E 0.3	Binary input 3
DI 0.04	E 0.4	Binary input 4
DI 0.05	E 0.5	Binary input 5
DI 0.06	E 0.6	Binary input 6
DI 0.07	E 0.7	Binary input 7
DI 0.08	E 0.8	Binary input 8
DI 0.09	E 0.9	Binary input 9
DI 0.10	E 0.10	Binary input 10
DI 0.11	E 0.11	Binary input 11
DI 0.12	E 0.12	Binary input 12
DI 0.13	E 0.13	Binary input 13
DI 0.14	E 0.14	Binary input 14
P1	Pulse 1	Pulse output 1
P2	Pulse 2	Pulse output 2

12.2.2 Inputs on the expansion module

UCS23B:

Designation in Documentation	Designation in MOVISAFE® Config UCS compact	Function
DI X.01	E X.1	Binary input 1
DI X.02	E X.2	Binary input 2
DI X.03	E X.3	Binary input 3
DI X.04	E X.4	Binary input 4
DI X.05	E X.5	Binary input 5
DI X.06	E X.6	Binary input 6
DI X.07	E X.7	Binary input 7
DI X.08	E X.8	Binary input 8
DI X.09	E X.9	Binary input 9
DI X.10	E X.10	Binary input 10
DI X.11	E X.11	Binary input 11
DI X.12	E X.12	Binary input 12
DIO X.01	EAE X.1	Configurable binary input/output 1
DIO X.02	EAE X.2	Configurable binary input/output 2
DIO X.03	EAE X.3	Configurable binary input/output 3
DIO X.04	EAE X.4	Configurable binary input/output 4
DIO X.05	EAE X.5	Configurable binary input/output 5
DIO X.06	EAE X.6	Configurable binary input/output 6
DIO X.07	EAE X.7	Configurable binary input/output 7
DIO X.08	EAE X.8	Configurable binary input/output 8
DIO X.09	EAE X.9	Configurable binary input/output 9
DIO X.10	EAE X.10	Configurable binary input/output 10
P1	Pulse 1	Pulse output 1
P2	Pulse 2	Pulse output 2

INFORMATION

X = 1: 1st expansion module

X = 2: 2nd expansion module

12.2.3 Outputs on the basic module

UCS10B/11B/12B:

Designation in Documentation	Designation in MOVISAFE® Config UCS compact	Function		
DO 0.00	A 0.1	Auxiliary output		
DO 0.01	A 0.2	Auxiliary output		
DO 0.02_P	AD 0.0_P	Auxiliary output		In combination with: Safe output
DO 0.02_M	AD 0.0_M	Auxiliary output		
DO 0.03_P	AD 0.1_P	Auxiliary output		In combination with: Safe output
DO 0.03_M	AD 0.1_M	Auxiliary output		
K 0.1	AK 0.1	Basis	Relay 1	In combination: Safe relay output
		NO contact		
K 0.2	AK 0.2	Basis	Relay 2	
		NO contact		

12.2.4 Outputs on the I/O expansion module

UCS23B:

Documentation	Designation in MOVISAFE® Config UCS compact	Function
DO X.00	A X.1	Auxiliary output
DO X.01	A X.2	Auxiliary output
DIO X.01	EAA X.1	Configurable binary input/output 1
DIO X.02	EAA X.2	Configurable binary input/output 2
DIO X.03	EAA X.3	Configurable binary input/output 3
DIO X.04	EAA X.4	Configurable binary input/output 4
DIO X.05	EAA X.5	Configurable binary input/output 5
DIO X.06	EAA X.6	Configurable binary input/output 6
DIO X.07	EAA X.7	Configurable binary input/output 7
DIO X.08	EAA X.8	Configurable binary input/output 8
DIO X.09	EAA X.9	Configurable binary input/output 9
DIO X.10	EAA X.10	Configurable binary input/output 10
P1	Pulse 1	Pulse output 1
P2	Pulse 2	Pulse output 2

INFORMATION

X = 1: 1st expansion module

X = 2: 2nd expansion module

13 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357 14 euro cents/min on the German landline network. Max 42 euro cents/min from a German mobile network. Prices for mobile and international calls may differ.
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15

France			
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com

Argentina			
Assembly **Sales**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	**Industrial Gears**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Brazil			
Assembly **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conparq 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 - Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn

China			
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales **Assembly** **Service**	**Prague**	SEW-EURODRIVE CZ s.r.o. Lužná 591 16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	HOT-LINE +420 800 739 739 (800 SEW SEW)	**Servis:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Copenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 EI Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate Normanton West Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911

Greece			
Sales	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodrivein-dia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com

Lebanon			
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be

Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg

Malaysia			
Assembly **Sales** **Service**	**Johor**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales **Service**	**Mohammedia**	SEW EURODRIVE SARL Z.I. Sud Ouest - Lot 28 2ème étage Mohammedia 28810	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 sales@dbmining.in.na

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Pakistan			
Sales	**Karachi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa Hotline 24H Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

South Korea			
Assembly **Sales** **Service**	**Ansan**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Swaziland			
Sales	**Manzini**	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sanayi Ticaret Limited Şirketi Gebze Organize Sanayi Bölgesi 400.Sokak No:401 TR-41480 Gebze KOCAELİ	Tel. +90-262-9991000-04 Fax +90-262-9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Assembly **Sales** **Service**	**Dnipropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

USA			
Production **Assembly** **Sales** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Vietnam			
Sales	**Ho Chi Minh City**	**All sectors except for ports, mining and offshore:** Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn truongtantam@namtrung.com.vn khanh-nguyen@namtrung.com.vn
		Ports, mining and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn

Zambia			
Sales	**Kitwe**	EC Mining Limited Plots No. 5293 & 5294,Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe	Tel. +260 212 210 642 Fax +260 212 210 645 sales@ecmining.com http://www.ecmining.com

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